15 CENTS

MODERN MECHANIX and INVENTIONS

AUG. 1933

AUG.

MODERN MECHANIX AND INVENTIONS

NOW 15¢

IN CANADA 20¢

SEE PAGE 44
Saunders

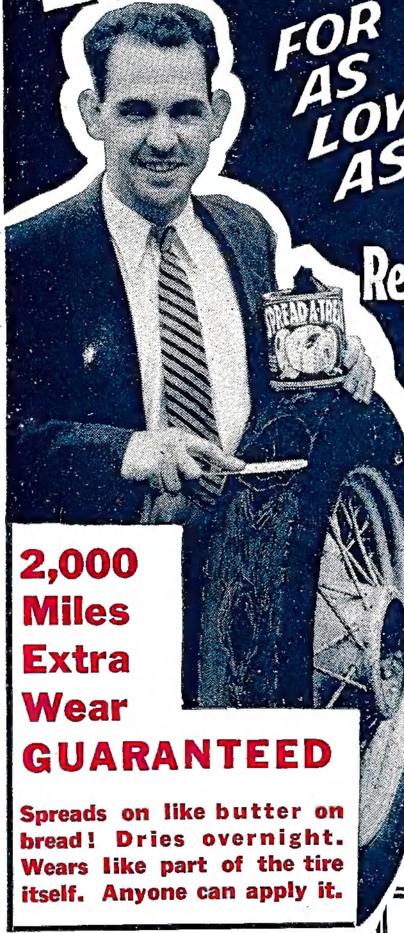
DEPRESSION SPURS LOST GOLD TREASURE HUNTS

Sensational Tire Repair Discovery!

Re-Treads Tires

FOR AS LOW AS **75** CENTS

Repairs Worn Spots for a Few Pennies



Pays AGENTS UP TO $6 AN HOUR

2,000 Miles Extra Wear GUARANTEED

Spreads on like butter on bread! Dries overnight. Wears like part of the tire itself. Anyone can apply it.

SPREAD-A-TREAD—The new sensational discovery. Covers old worn tires with a new, tough, flexible, long wearing tread for as low as 75c. Repairs a worn spot for a few pennies. At least 2,000 additional miles GUARANTEED. Many Spread-A-Tread applications wear 6,000 to 12,000 miles. An amazing opportunity for agents to make up to $6.00 in an hour. Rich territories now being allotted—act today to reserve yours.

SPREADS on with a knife—Dries over night

Anyone can apply Spread-A-Tread. An old knife is all you need. No other tools necessary. It spreads on like spreading butter on bread. Dries over night—tough, flexible and long-wearing. CAN'T come off.

Ends Costly Tire Repairs — Helps Prevent Accidents

SPREAD-A-TREAD ends costly vulcanizing or re-treading. Saves buying new tires. Helps prevent skidding, punctures, blowouts and accidents due to poor tires. Seals holes and cracks. Rebuilds tire from outside without taking off car or even letting out the air. Reinforces weak spots. Vulcanizes itself to the old tire so that it cannot crack or peel off. Saves delays and repairs. Protects fabric against water, grit, rot and wear. Makes driving safer. Test SPREAD-A-TREAD at my risk.

Mail Coupon for FREE Sample

Mail Coupon for FREE sample of SPREAD-A-TREAD on tire fabric, special agent's exclusive territory offer and FREE illustrated BOOKLET. I will also show you how other men are making up to $6.00 in an hour with this amazing product that is bought eagerly by owners of motor cars and trucks. Chaulfort made over $16 his first three hours. Flood made $168 his first week. Pegram made $182 in eleven days. Mail Coupon today.

Made $1,734 in Two Weeks

Harry Gillig, of Kansas, forms his own sales company for distributing SPREAD-A-TREAD. In 2 weeks he sold 7 gross giving him a profit of $1,734. Hundreds of others making big money in spite of "Hard Times." You have the same opportunity.

PLASTIC RUBBER COMPANY OF AMERICA
Dept. H-235, E. Court St. Cincinnati, Ohio

Good for FREE Sample

PLASTIC RUBBER CO. OF AMERICA,
Dept. H-235, E. Court St., Cincinnati, Ohio.

I am interested in SPREAD-A-TREAD. You may send me the Free Sample of SPREAD-A-TREAD on tire fabric and Free illustrated Booklet. Also tell me how other men are making up to $6.00 in an hour.

Name ....

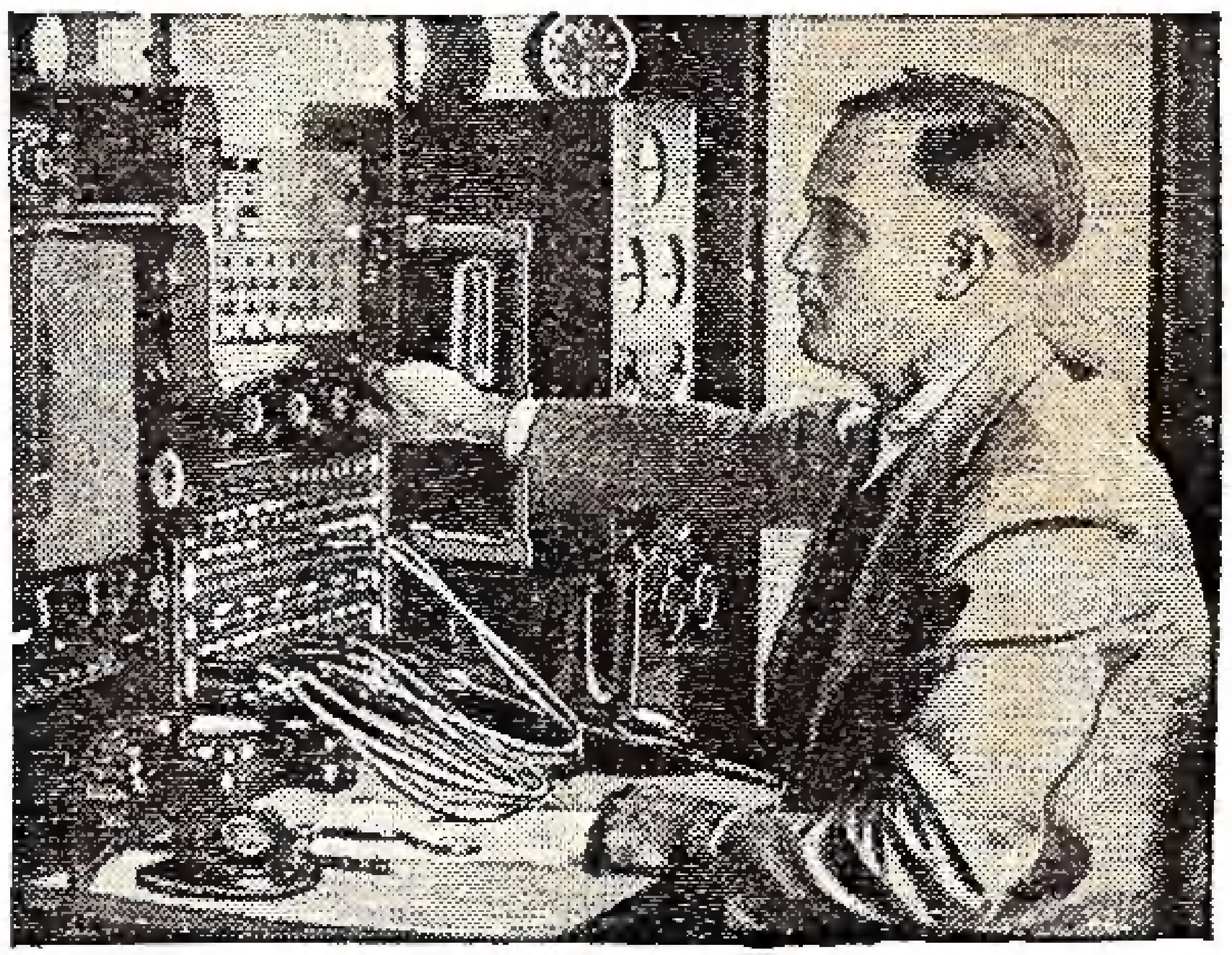
Address ....

City .... State ....

Territory interested in ....

I will Train You at Home

in your spare time to fill a GOOD JOB in Radio

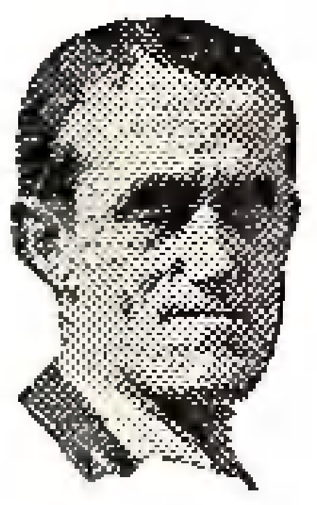


SPECIAL Radio Equipment for Broad Practical Experience *Given Without Extra Charge*

Here's Proof

"Made $6,000 in 2 Years"

"Soon after the depression started, I found myself without a job, but I was well protected with N. R. I. training. I swung right to full-time Radio servicing and I have made over $6,000 in a little over two years."—WM. SPARTIVENT, Sparty Radio Service, 93 Broadway, Newark, N. J.



$120 a Month in Spare Time

"I'm servicing from 3 to 5 sets daily in spare time, and average $120 a month from my Radio work. I still hold my regular day job. I owe my success to N. R. I."

A. E. FARMER,
1012 Denison St.,
Muskogee, Okla.

Increased Salary $1,000 a Year

"Now I have under construction an up-to-date transmitter for Station WAMC, of which I am engineer. My salary has increased $1,000 per year since entering Radio due to your splendid training."

JULIUS C. VESSELS,
Radio Station WAMC,
Anniston, Ala.

Free Book Tells How Mail Coupon!

Get away from disagreeable jobs with no future. From skinny, little pay envelopes. From skimping along, just barely getting by, but not getting ahead. DON'T PUT UP WITH THEM ANY LONGER. Get into a field with a future. Act today to put yourself ahead. Mail the coupon for my free 64-page book that tells how you can train at home in your spare time to be a Radio Expert; about my course that doubles and triples the pay of many who take it. MAIL THAT COUPON NOW and take the first step toward a real future.

Real Opportunities Ahead in Radio for Trained Men

It's hard to find a field with more opportunity awaiting the trained man. Why in 1931—right in the middle of the depression—the Radio Industry sold $300,000,000 worth of sets and parts! Manufacturers alone employed over 100,000 people! 300,000 people worked in the industry. In 1931 broadcasting revenue jumped 20 per cent over 1930, and 1932 is even better. It's a gigantic business, even in the worst business years! And look what's ahead! Millions of sets becoming obsolete annually. 16,000,000 sets in operation that need servicing from time to time! Over 600 great broadcasting stations furnishing entertainment and news to 100,000,000 people. These figures are so big that they are hard to grasp! Yet, they are all true! Here is a new industry, just 12 years old, that has grown into a commercial giant. No wonder great business leaders predict a brilliant future for this great and growing business.

Get Into This Field With a Future

There's opportunity for you in Radio. Its future is certain. Television, short wave, police Radio, automobile Radio, talking movies, public address systems, aircraft Radio—in every branch, developments and improvements are taking place. Here is a real future for thousands and thousands of men who really know Radio. Get the training that opens the road to responsibility, good pay and success! Send me the coupon now, and get full particulars on how easy and interesting I make learning at home. Read the letters from graduates who are today earning real money in this fascinating industry.

Turn Your Spare Time Into Money!

My book also tells how many of my students made $5, $10 and $15 a week extra in spare time, soon after they enrolled. I give you plans and ideas that have made good spare-time money—$200 to $1,000 a year—for hundreds of fellows. My course is famous as "the one that pays for itself."

Money Back If Not Satisfied

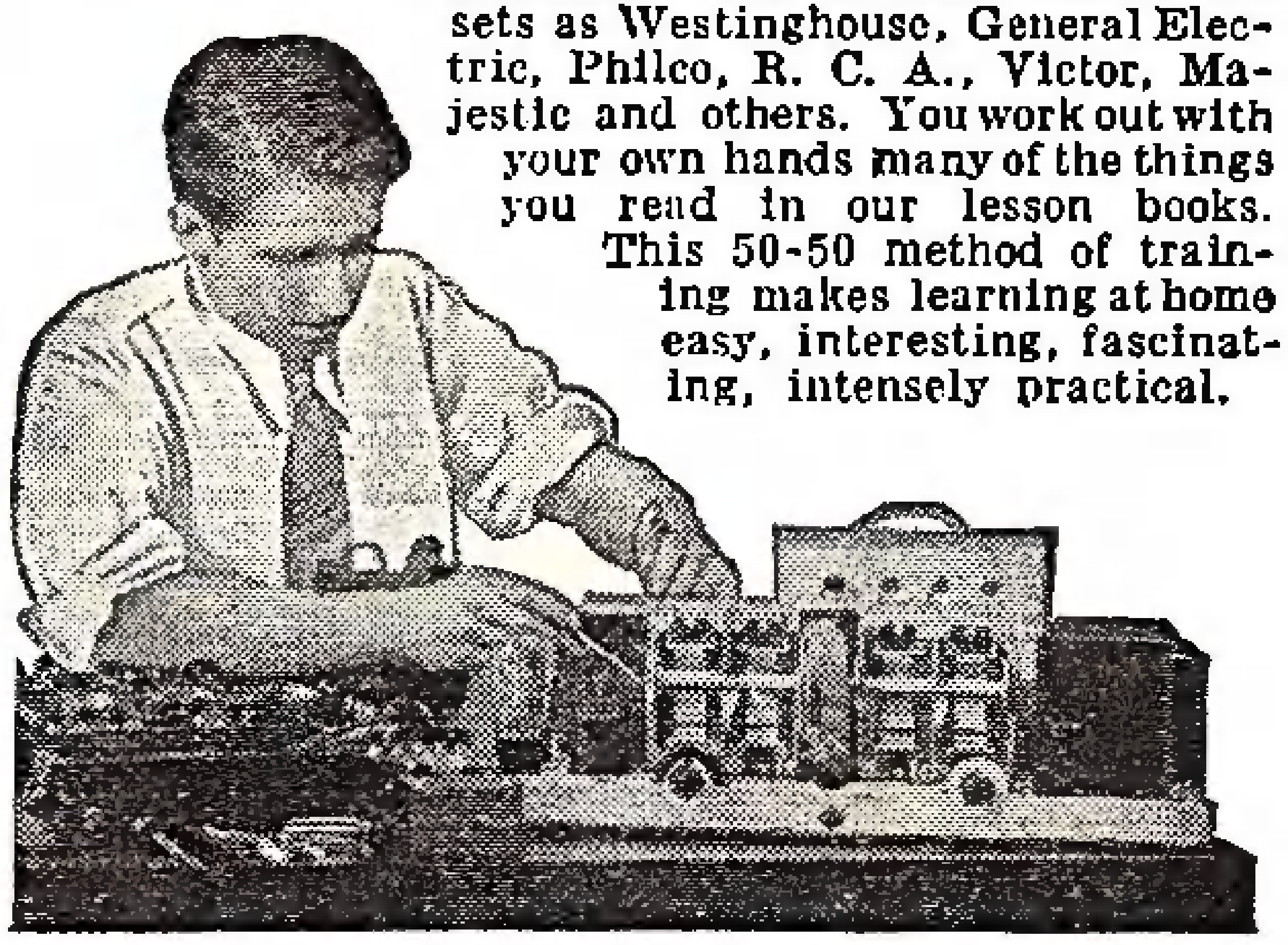
I am so sure that N. R. I. can train you satisfactorily that I will agree in writing to refund every penny of your tuition if you are not satisfied with my Lessons and Instruction Service upon completion. You'll get a copy of this Agreement with my book.

64-Page Book of Information Free

Get your copy today. It's free to all residents of the United States and Canada over 15 years old. It tells you about Radio's spare-time and full-time job opportunities; it tells you all about my course; what others who have taken it are doing and making. Find out what Radio offers YOU without the slightest obligation. MAIL THE COUPON NOW.

J. E. SMITH, President
National Radio Institute, Dept. 3HH
Washington, D. C.

My course is not all theory. I'll show you how to use my special Radio equipment for conducting experiments and building circuits which illustrate important principles used in such well-known sets as Westinghouse, General Electric, Philco, R. C. A., Victor, Majestic and others. You work out with your own hands many of the things you read in our lesson books. This 50-50 method of training makes learning at home easy, interesting, fascinating, intensely practical.



I have doubled and tripled the salaries of many. Find out about this tested way to BIGGER PAY

RICH REWARDS IN RADIO

Get a Job with a Future

FILL OUT AND MAIL THIS COUPON TODAY

J. E. SMITH, President
National Radio Institute, Dept. 3HH
Washington, D. C.

Without obligating me, send free book about spare-time and full-time Radio opportunities and how I can train for them at home. I am particularly interested in the job checked.

- ( ) Service Manager for Retail Stores.
- ( ) Set Servicing Expert.
- ( ) Broadcast Engineer
- ( ) Operator in Broadcast Station.
- ( ) Aircraft Radio Operator.
- ( ) Operator of Airway Beacons.
- ( ) Service Man on Sound Picture Apparatus.
- ( ) Operator of Sound Picture Apparatus.
- ( ) Ship Operator.
- ( ) Service Man on Public Address Systems.
- ( ) Installation Engineer on Public Address Systems.
- ( ) Sales Manager for Retail Stores.
- ( ) Auto Radio Installation and Service Man.
- ( ) Television Broadcast Operator.

NAME..

ADDRESS....................................

CITY..............................STATE........
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The Famous Course That Pays For Itself

August, 1933

VOLUME X
NUMBER 4

MODERN MECHANIX AND INVENTIONS

Donald G. Cooley
EDITOR

PRICE 15 CENTS
(20 CENTS IN CANADA)

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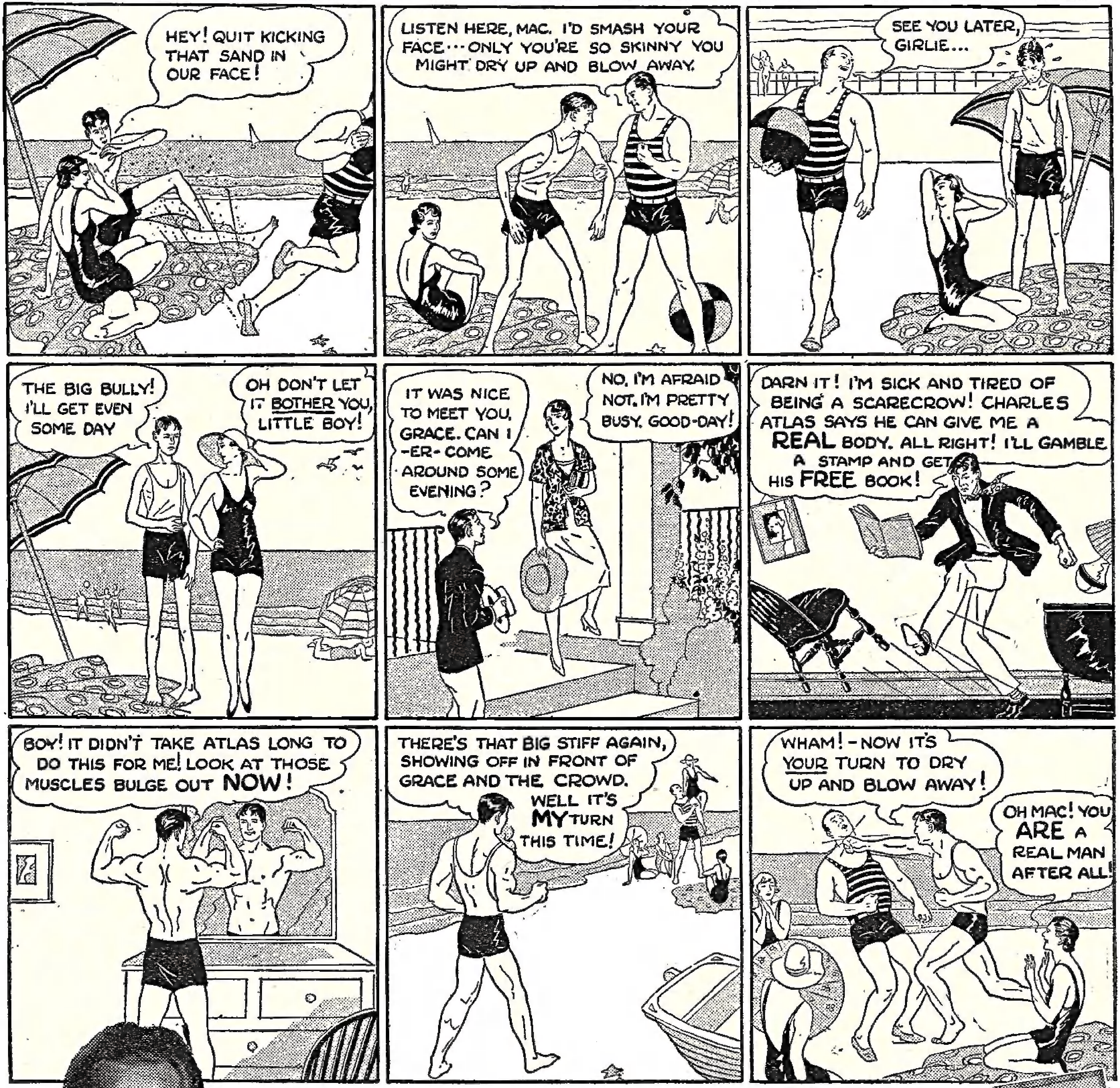
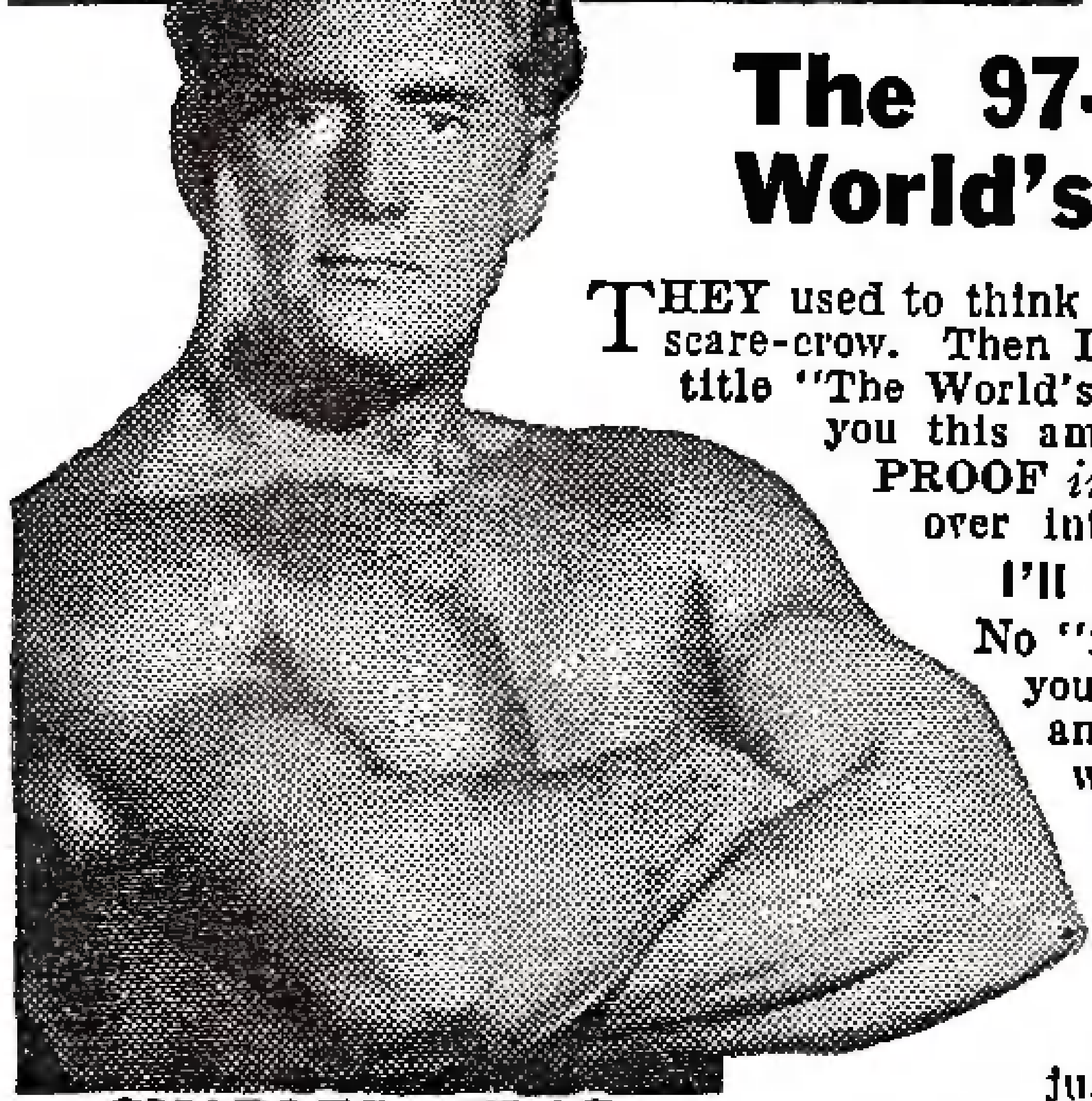
THE INSULT THAT MADE A MAN OUT OF "MAC"


HEY! QUIT KICKING THAT SAND IN OUR FACE!
LISTEN HERE, MAC. I'D SMASH YOUR FACE··· ONLY YOU'RE SO SKINNY YOU MIGHT DRY UP AND BLOW AWAY.
SEE YOU LATER, GIRLIE...
THE BIG BULLY! I'LL GET EVEN SOME DAY
OH DON'T LET IT BOTHER YOU, LITTLE BOY!
IT WAS NICE TO MEET YOU, GRACE. CAN I -ER- COME AROUND SOME EVENING?
NO, I'M AFRAID NOT. I'M PRETTY BUSY. GOOD-DAY!
DARN IT! I'M SICK AND TIRED OF BEING A SCARECROW! CHARLES ATLAS SAYS HE CAN GIVE ME A REAL BODY. ALL RIGHT! I'LL GAMBLE A STAMP AND GET HIS FREE BOOK!
BOY! IT DIDN'T TAKE ATLAS LONG TO DO THIS FOR ME! LOOK AT THOSE MUSCLES BULGE OUT NOW!
THERE'S THAT BIG STIFF AGAIN, SHOWING OFF IN FRONT OF GRACE AND THE CROWD.
WELL IT'S MY TURN THIS TIME!
WHAM! - NOW IT'S YOUR TURN TO DRY UP AND BLOW AWAY!
OH MAC! YOU ARE A REAL MAN AFTER ALL!



CHARLES ATLAS
Holder of the title: "The World's Most Perfectly Developed Man"

The 97-lb. Weakling Who Became "The World's Most Perfectly Developed Man"

THEY used to think there wasn't much hope for me. I weighed only 97 pounds. I was a sickly scare-crow. Then I discovered *Dynamic-Tension.* It gave me the body that twice won the title "The World's Most Perfectly Developed Man." Now I make you this amazing offer. *At my own risk* I'll give you **PROOF** *in just 7 days* that my same method can make you over into a NEW MAN of giant power and energy.

I'll PROVE You Can Have a Body Like Mine!

No "ifs"—"ands"—or "maybes." Just tell me where you want handsome, steel-like muscles. Are you fat and flabby? Or skinny and gawky? Are you short-winded, pepless? Do you hold back and let others walk off with the prettiest girls, the best jobs? *Give me just 7 days!* I'll PROVE that *Dynamic-Tension*—without any pills, or unnatural dieting or weights and pulleys that may strain your heart or other vital organs—can make you a healthy, confident, powerful HE-MAN! In just a few minutes a day! Mail coupon NOW for my illustrated book, "Everlasting Health and Strength." Tells all about *Dynamic-Tension.* Shows actual photos. It's a valuable book! And it's FREE. Send for your copy *today.* Address me personally: Charles Atlas, Dept. 6-8, 133 E. 23d St., N. Y. City.

CHARLES ATLAS
Dept. 6-8,
133 E. 23rd St., New York City

I want the proof that your system of *Dynamic-Tension* will make a New Man of me—give me a healthy, husky body and big muscle development. Send me your free book, "Everlasting Health and Strength."

Name ....
(Please print or write plainly)

Address ....

City .... State..........

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EDITED BY EXPERTS

Listed here are the members of the Modern Mechanix Board of Editors, all qualified by national repute to serve as authorities. They will gladly answer questions from readers if stamped envelope is sent. Address them in care of this magazine, 529 S. 7th St., Minneapolis, Minn.

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Famous Aviator, Holder of Light Plane Endurance Flight Record

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Associate Editor

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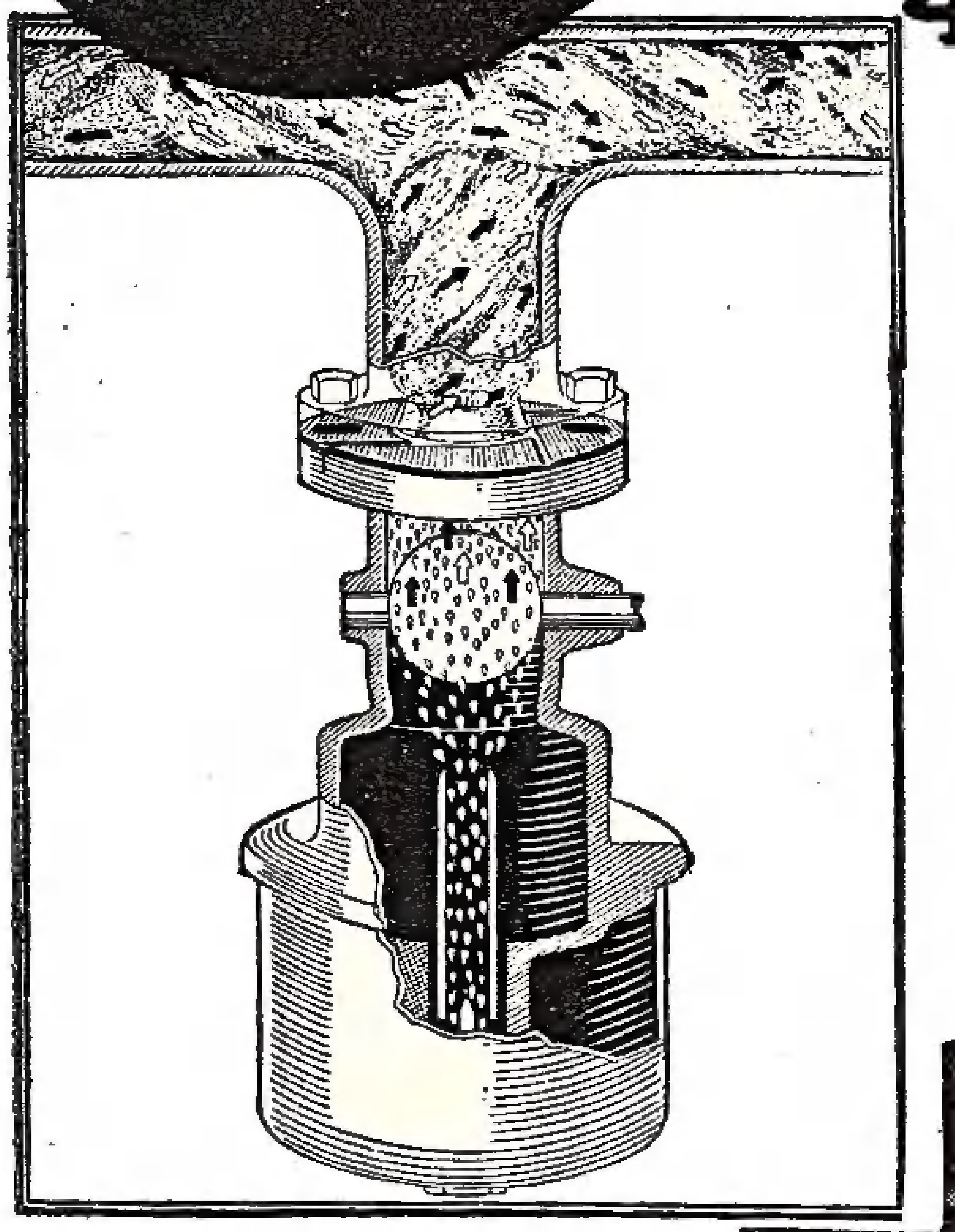
Associate Editor

51 MILES ON A GALLON of GASOLINE WINS ECONOMY CONTEST

49 MILES Takes 2nd Place

Winning Cars Equipped With WHIRLWIND GAS SAVERS



Automobile owners who have been worrying about gasoline expense will be interested in an amazing test recently conducted by a Texas Motor Car Company. Twenty-three cars were entered in a mileage economy test, the winning car running 51 miles on a gallon of gas, the second car 49 miles on a gallon. When official test records were published it was found the two winning cars were both equipped with Whirlwind gas savers.

"Peak" Contest Mileages

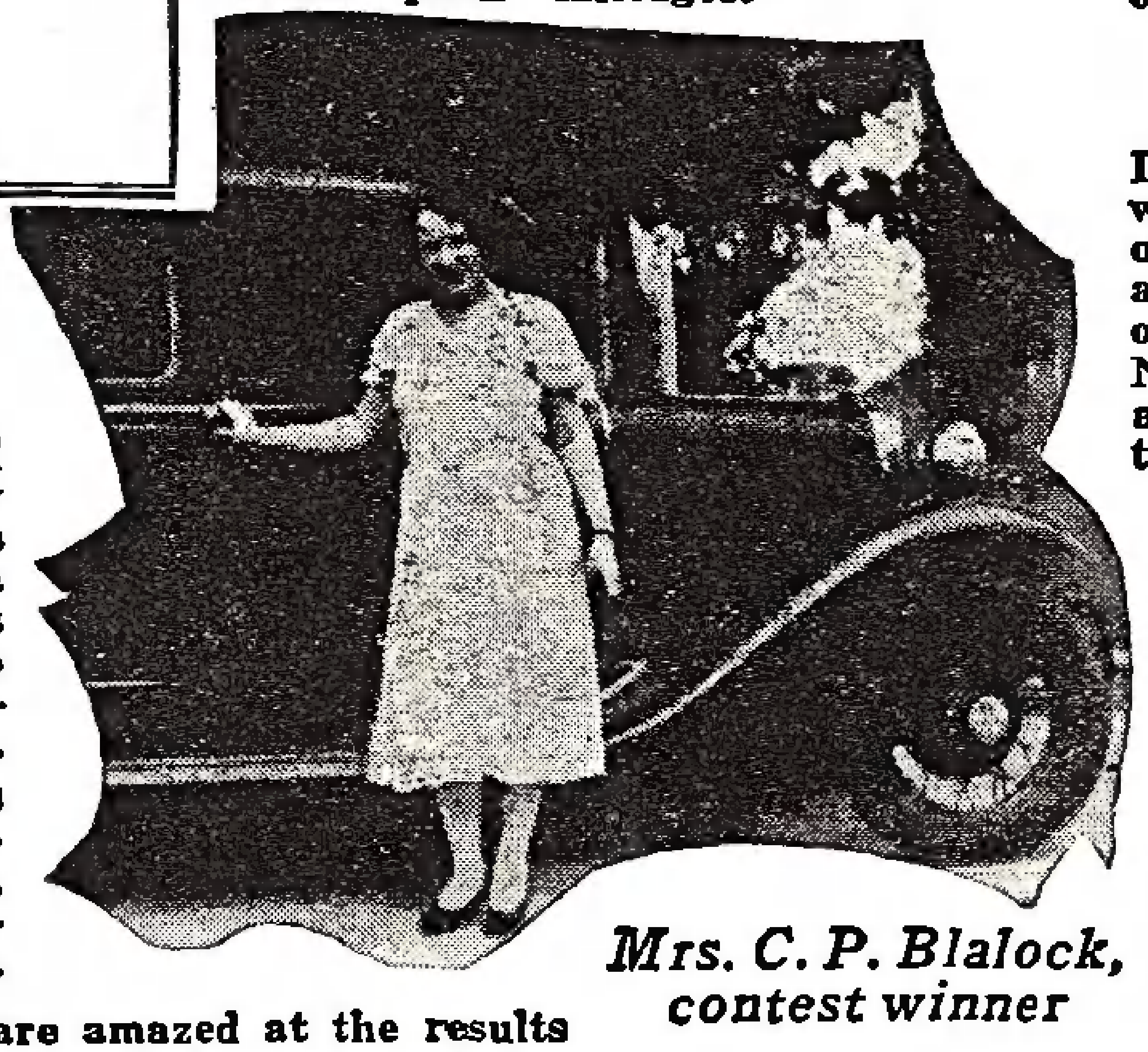
The amazing results obtained in this mileage contest are naturally greater than those obtained in ordinary driving. Careful throttling, most economical speeds—no traffic hold-ups—and no waste of power thru quick stops, help to bring about these "peak" mileages.

A Test On Your Car

More power, faster pick-up, less carbon, quicker starting, and increased mileage is what users say in telling of their experience with the Whirlwind. Every motorist owes it to himself to test the Whirlwind to prove the results on his own car.

FITS ALL CARS

In just a few minutes the Whirlwind can be installed on any make of car, truck or tractor. It's actually less work than changing your oil or putting water in the battery. No drilling, tapping or changes of any kind necessary. It is guaranteed to work perfectly on any make of car, truck or tractor, large or small, new model or old model. The more you drive the more you save.



Mrs. C. P. Blalock, contest winner

How Whirlwinds Save Gasoline

The principle of the Whirlwind is to slightly compress the partly vaporized gasoline as it passes thru the raised venturi. Extra air enters from four air inlets at such a tangent as to pick up the unvaporized gasoline particles, whirling them into action. The turbulence created breaks them into a vaporized gas, giving better, smoother power, quicker starting, cutting gasoline waste and carbon formation.

Car owners all over the world are amazed at the results of their tests. "I have more speed, power, and increased mileage," writes Henry Bomberger. "Hills I used to take in second I now make in high." Anton Wetsch: "I wouldn't take the Whirlwind off my car for any money. I am certainly convinced." W. B. Fountain: "My mileage has increased greatly. My car has plenty of pick-up and starts like a whip."

GUARANTEE

No matter what kind of a car you have or how big a gas eater it is the Whirlwind will save you money. While we do not claim to produce 49 to 51 miles on ordinary driving, we do guarantee that the Whirlwind will save its cost within 30 days or the trial will cost you nothing. We invite you to test it at our risk. You are to be the sole judge.

SALESMEN AND DISTRIBUTORS WANTED
To Make Up To $100 A Week and More

Whirlwind men are making big profits taking care of local business for this fast selling device that car owners cannot afford to be without. Good territory is still open. Free sample offer to workers. Full particulars sent on request. Just check the coupon.

WHIRLWIND MFG. COMPANY

Dept. 968-A Station C Milwaukee, Wis.

FREE OFFER COUPON

WHIRLWIND MANUFACTURING CO.,
Dept. 968-A, Station C, Milwaukee, Wis.

Gentlemen: You may send me full particulars of your Whirlwind Carbureting device and tell me how I can get one Free. This does not obligate me in any way whatever.

NAME ....

ADDRESS ....

CITY ....*STATE* ....

☐ Check here if you are interested in full or part time salesman position.

At Last—
Garbo's True
Life Story!

Garbo's ex-secretary lifts the veil of mystery and tells the true story of her life and career in pictures for the first time. Scores of hitherto unpublished facts and anecdotes and an insight into Garbo's personality that you've never had before. You'll thrill and be delighted with its amazing revelations!

Pardon Our Operations—

What do the stars think of when they're on the operating table and death seems at hand? Look for the absorbing story of the stars' thrilling hospital experiences. Also: Ruby Keeler's Sensational Rise to Stardom; Charlie Farrell Tells the Whole Truth; The Love Letters of Jimmy Durante to Garbo; Mae West's Broadway Adventures and other fascinating features of the stars and Hollywood life too numerous to mention. Read them in—

August

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If your news dealer is sold out, send 10c, stamps or coin, to SCREEN PLAY, 529 South 7th St., Minneapolis, Minn., and a copy of the August issue will be mailed to your address.

Depression Spurs Treasure Hunt

(Continued from page 47)

shire. I was sure I would be dead in a matter of moments. I was down under pressure of 400 pounds to the square inch. My breathing became more difficult."

In these waters of black menace, more horrible than any of Poe's tombs of living death, Courtney struggled for a half hour that seemed a month—tugging frantically at his signal cable, getting no response, losing blood from the frightful gash in his side and suffering excruciating pain from his shattered wrist. Minutes dragged past, each heavy with the conviction that the next moment would bring a rush of death-dealing waters—and then the cables stirred. Forces of the current were bested at last, and Courtney was lifted to the surface.

"Several hours later I happened to be looking in a mirror, for curiosity rather than for vanity. To my amazement I discovered that my hair had turned almost white from the frightful experience I had in Neptune's chamber. But I'm happy to say it was just another set of mixed tumblers locking a vault out of which I was very lucky to escape. When I returned to the tranquil routine of my West 125th St. shop during the latter part of last May, I had 12 stitches in my side and my wrist was encased in a plaster cast."

After that catastrophe, work of salvaging the *Hampshire* was postponed until late summer. It is rumored that the British government is negotiating to buy up the rights of Mr. X and his co-workers.

Interest in salvaging operations is world wide. Efforts are being made to obtain the $5,000,000 which went down with the English frigate *Lutine* which sank off the mouth of the Zuyder Zee in 1799. Still others are trying to get back $10,000,000 in Spanish gold which sank with the frigate *De Braak* off the Delaware Capes in 1798.

There are several other similar expeditions. Some of them are working secretly. Only recently a specially-equipped submarine steamed out of New York harbor on a salvage mission. No one knows the mysterious craft's personnel, no one knows her destination.

No one knows with any authority exactly how many treasure ships lie in unmarked graves. Only recently Allan C. Robertson, searching through dingy old records, came across accounts of the sinking of the *De Braak* in colonial days, carrying a reputed $40,000,000 in gold—under only 70 feet of water. One of the illustrations with this article shows the recovery methods he is pursuing in seeking this fabulous treasure.

One of the most remarkable of the new treasure salvaging devices is the diving suit shown on page 46, developed by J. S. Peress, of Byfleet, England. It is extraordinarily strong, enabling descents to 1200 feet, a previously unheard of depth. The diver carries his own air supply on his back, eliminating pumping lines. Despite its size, the suit is very flexible under water, the joints moving in an oil cushion. Pincer-like claws at the end of each arm function like fingers. The depths at which the new suit can operate brings such treasure ships as the *Lusitania,* lying in 700 ft. water, within range of diving operations

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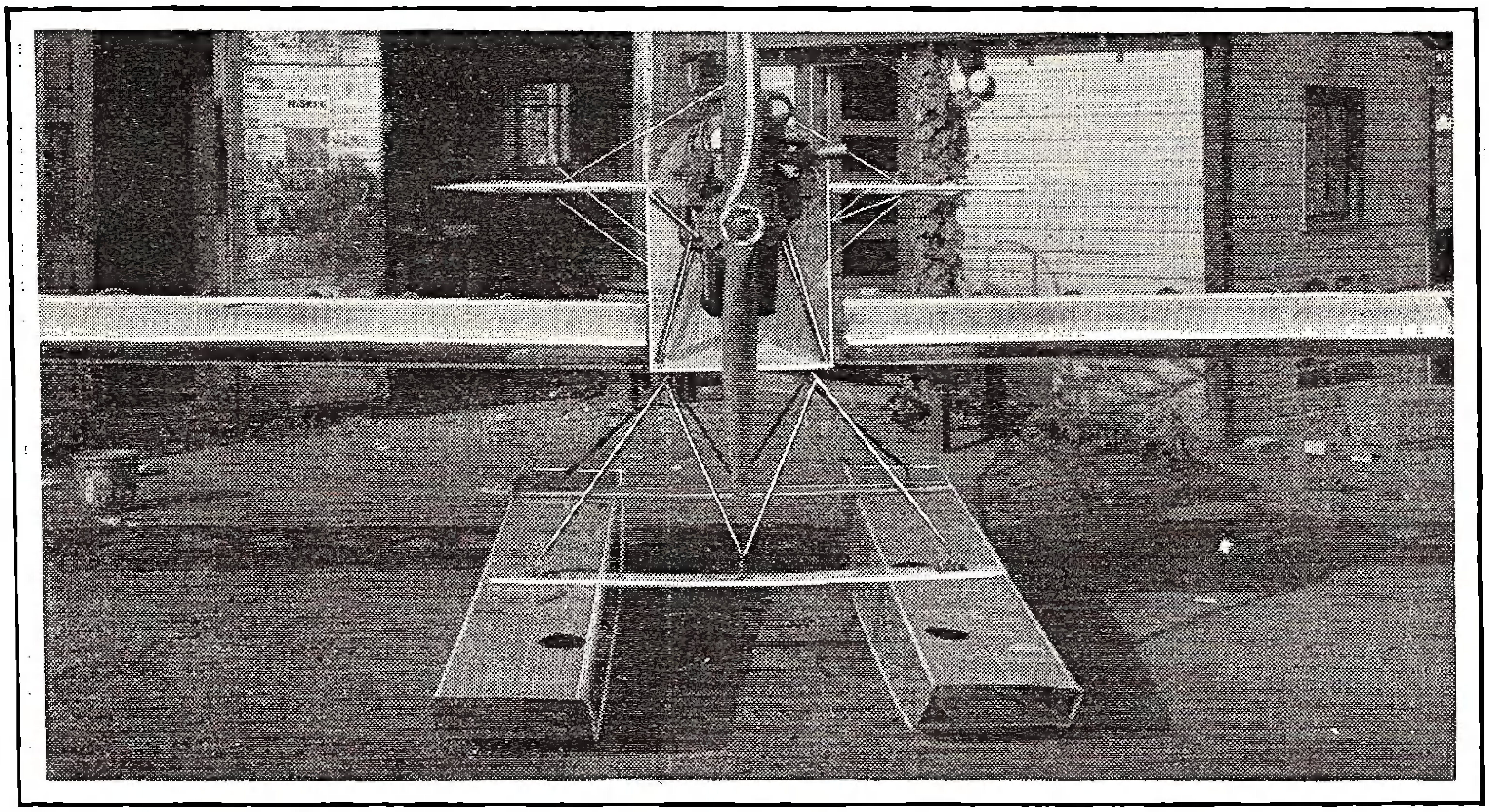


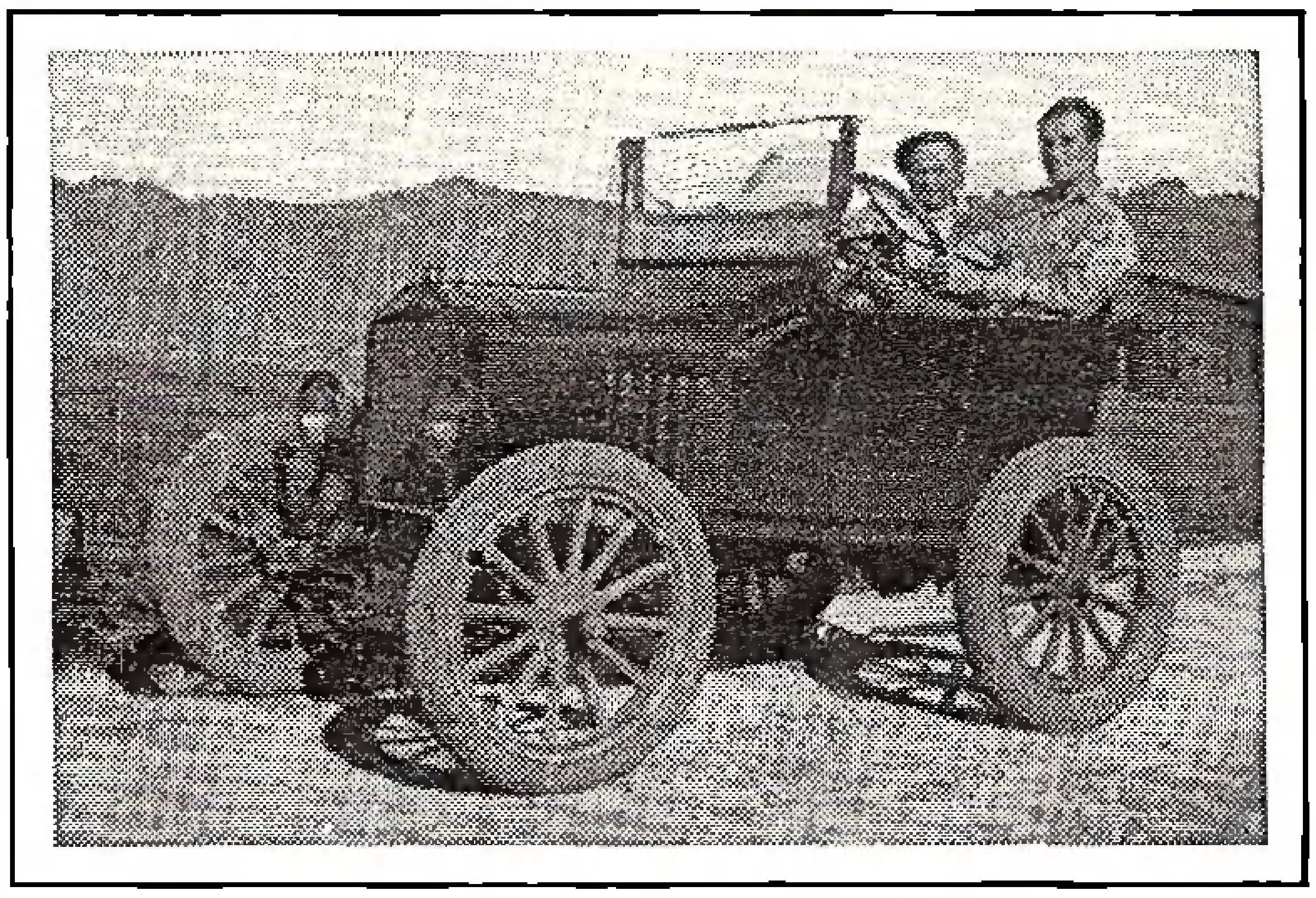
"Just to use up an old cut," explains Andy, "I'm answering a host of nuts who wrote in wanting another look-see at the seaplane job (non-flying) that ran last month. Here she is before covering. Shot was taken by Sam Wing."

Andy's Shop Mail Box

Andy takes himself a well-earned vacation in California, and prior to shoving off he leaves a load of threats to keep things going smoothly for his pet pig while he's away.

THE time has come, as the Walrus said, to look at many things.

I've been sitting on my haunches in and about the old Robbinsdale hangar now for a couple of years without ary being able to get away, and now what with summer coming, I'm loading up the old DH Moth with an extra quart of oil, sewing a five dollar bill to the underside of the cockpit cushion to protect me from myself in my wild-sailor spending sprees, and one of these days you guys in California will see me hopping over the hedges to Louse Angles, where theys a lot of stuff I've been missing and need to get caught up on. I'll be there when you read this. And before I go I'm laying down the law to keep things intact until I get back. More of that later.



This Comedy Ford at last has been claimed by her owner and builder, an anonymous nut who lives in Soquel, Calif.

* * *

I've always made it a rule not to run an anonymous letter. And the only reason this is anonymous is because I lost the envelope containing the gent's name. But the text is worth digesting:

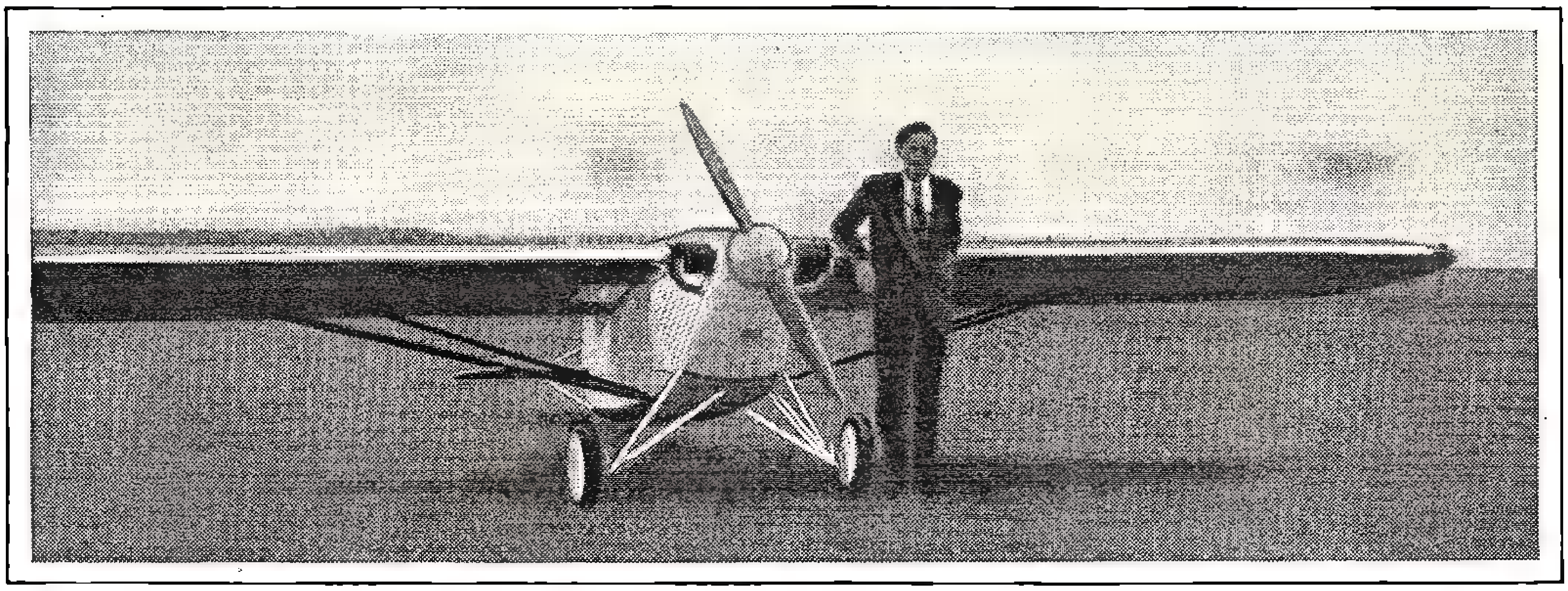
Soquel, California,
P. O. Box 283.

Dear Andy and Gang:

Boy, I've got to hand it to you and Double M for publishing the sweetest mag I ever read. I have enjoyed reading letters in your mail box next to what you have to say for yourself.

I am sending you a picture of the Comedy Ford which I built from details which appeared in the February issue of the good old M.M.

Wow, talk about a riot, you would think a circus was in town the way people run out of doors and alleyways, people on the sidewalks all come to a stop to watch old Liz caper around and do her stuff. I nearly got a ticket for blocking traffic. Everybody stopped to watch old Liz perform her newborn self.



Built by a pal of Leslie Long's, this Church Mid Wing has given a rousing account of herself with that highly successful Long-designed motor, the Harlequin. Les has more to say about the motor and ship elsewhere in the column.

I have two more short jack shafts for Fords, so if any of the gang would like one, to build up their Comedy Ford, I will sell them reasonable.

Always yours for old M.M. and M. P. mags.

THE CALIFORNIA GREASE NUT.

P.S. Since reading the good old M.M. I can just about make or repair anything you want except a broken heart.

* * *

Here's a chap who has taken a Modern Mechanix and Inventions design and done an intelligent job of following the plans. Witness the views of Mr. Warren La Barre's "Whizzer," designed by Westy Farmer and included in the cargo of "How to Build 20 Boats." Mr. La Barre's letter:

Dear Andy:

This is the first time I have written to you although I get the M.M. every month, and I think it is a swell mag.

I am sending you a couple of snapshots of the boat I built from your plans of the "Whizzer" but I changed some of the things a little. The hull is made of 1/4" plywood which I soaked in linseed oil, painted with three coats of paint and two of varnish. It does not leak a drop. It weighs about 175 lbs. with motor and draws about 4 in. of water. The motor is a HD-74 and is mounted on part of the frame. It is braced up with 1" water pipe and 1/8" steel cable crossed, with turnbuckles to steady it.

The prop is made of three pieces of mahogany glued together. It is four feet long and has a four-foot pitch. It will go about 25 to 30 m.p.h., depending on the wind and current. Everything else is made from the "Whizzer" plans.

Always a M.M. reader,

Warren La Barre,
903 N. E. Portland Blvd.
Portland, Oregon.

* * *

Later I'm running a letter from Harry Lowe Brownback, a swell gent, by the way, who has something to say about the matter of patents on these hydro-gliders.

* * *

This letter might be prefaced with a thousand comments. I've written all of them and scrapped all of them, so I'm running it as is, wiping a salt tear away from my face for you-know-what:

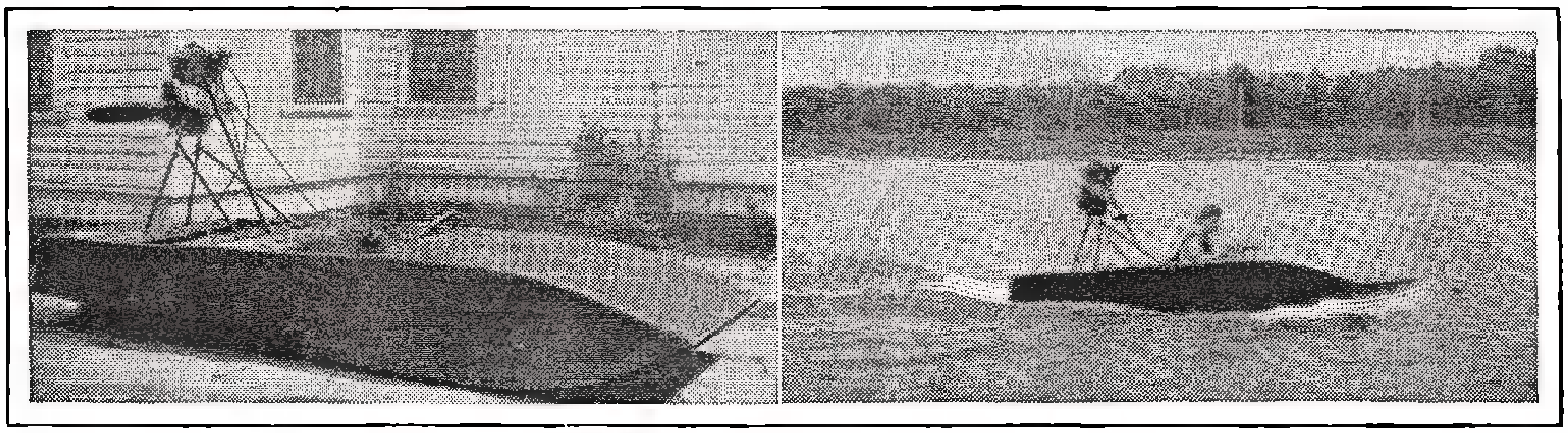
Dear Andy:

Looks as though you were leaning slightly away from amateur light planes. I would be sorry to see you leave the game. I wish you could see fit to run the article and sketches on changing my Longster over to take the Harlequin motor. You will recall that you had me make up the drawings and the article was promised for publication in MM as soon as the Harlequin series was done. I have had a number of letters asking when it would be out.

Last winter I sent you a couple of shots of a Church midwing powered with a Harlequin, and these have not showed up either. Wish you could run them in Andy's strip.

The motor is certainly satisfactory. There

(Continued on page 12)



These views are of the "Whizzer," built to Farmer's plans, by Warren La Barre, of Portland, Oregon. Mr. La Barre says he gets about 25 miles per hour. Left, the little hydro out of her element, and right "getting out and on it."

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ANDY'S SHOP MAIL BOX

(Continued from page 11)

has never been the slighest trouble in any so far made. They just naturally have the stuff. I have made a few changes and have increased the output. If you feel like it try to run the red paragraph.

Leslie Long,
Cornelius, Oregon.

Les Long, designer of the well known Harlequin, has made some changes in the motor since the series of articles on its construction were printed. The displacement has been increased to 96 cubic inches, increasing the horsepower to approximately 35. The bronze bushing used for a rear main bearing has been replaced by an SKF ball bearing which considerably simplifies the construction and adds to the efficiency. Details on these changes may be had from Mr. Long.

* * *

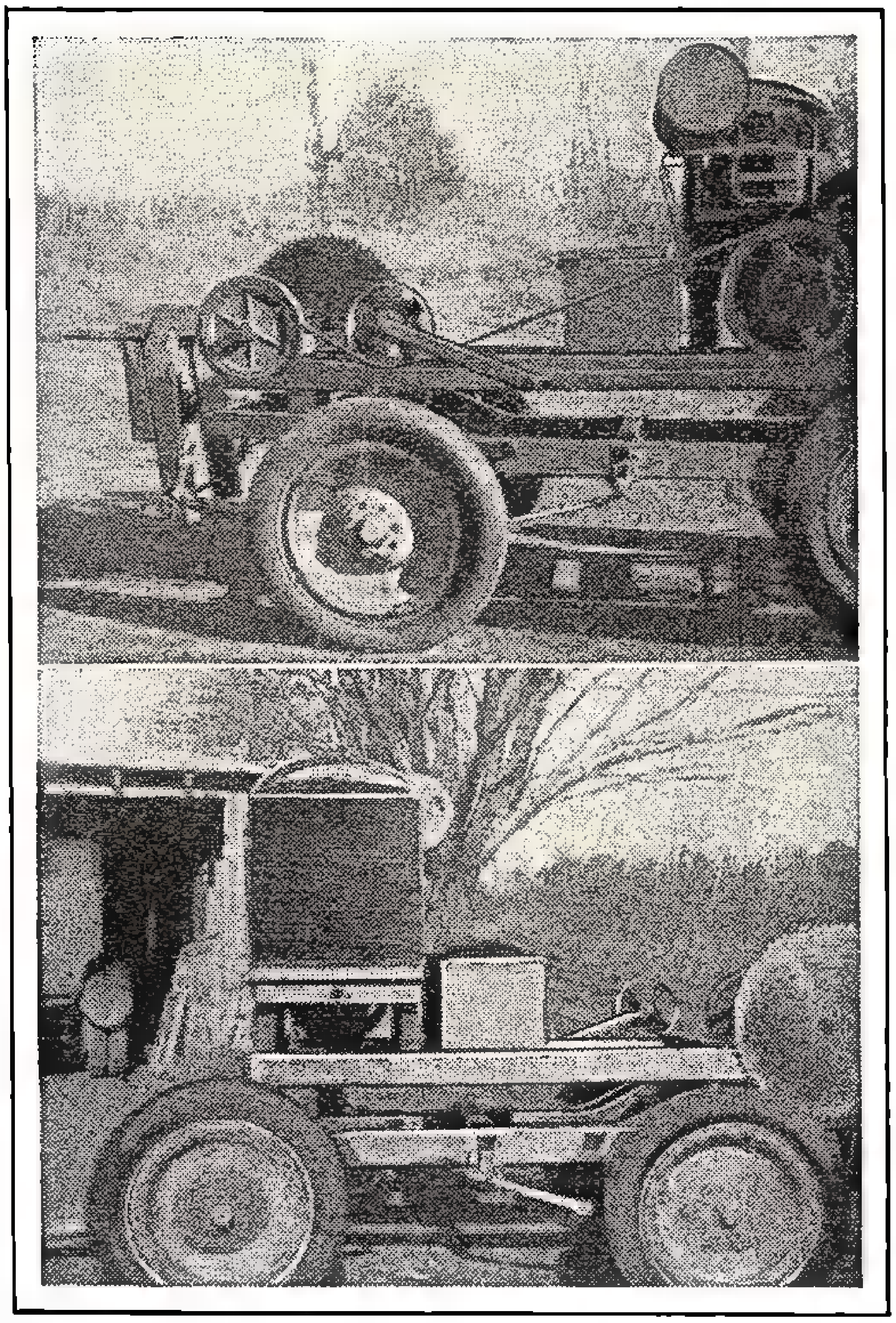
Many clever chaps while away hours of genius out behind the old homestead barn. One of the neatest farm-produced contraptions I have seen in many a moon was made with a handful of junk by Art Brown, of Brimfield, Mass. I am running a pic of his saw rig, and the letter that reached me from him.

Tower Hill Road,
Brimfield, Mass.

Gentlemen:

I herewith inclose two photos of a portable

(Continued on page 17)



This sweet little saw rig was made by A. E. Brown, of Brimfield, Mass. She is turned over by an old Reo chug-chug.

Secrets of Ancient Medicine Men

(Continued from page 54)

human eye was one of the superstitious cures for eye trouble.

A prescription for stomach ache called for the removal of the heart of a living lark and its being worn on the left thigh.

Epileptics were instructed to gather peonies at night when the moon was on the wane and, wrapping them in linen, to wear them as an amulet. A nail from a cross, removed and suspended about the neck, was another prescription for the epileptic.

Since some forms of epilepsy have been listed as highly curable under the new system, it is pointed out that this superstition may have produced many actual cures in spite of the ridiculous nature of the instructions.

A difficulty encountered is the fact that practically all minor ailments, most physical injuries and a considerable number of serious physical disorders generally end in recovery of the patient. It was this fact that convinced the savage that his medicine man had supernatural powers and it still operates to convince the followers of modern cults of miraculous cures.

Experimenters delving into the subject, taking account of the fact that most persons recovered from their ills in time, set out to learn whether the followers of healing cults recovered more rapidly than the non-believers and their experiments are said to have borne out the belief that they do.

To discover the reason for this, a study of general physical effects traceable to purely mental or spiritual causes was undertaken. It was noted at once that fright quickened the heart beat, that worry upset the digestion, that envy, jealousy and hatred affected nerves, glands and blood vessels.

This indicated that there were certain emotions that could be tabulated as harmful. Among these were: pessimism, dissatisfaction, grief, alarm, timidity, anxiety, despondency, suspicion, hatred, worry, cowardice, anger, moroseness, remorse, vacillation, selfishness, envy, jealousy.

These, upon analysis, were found to be merely different forms of fear, selfishness or discouragement. For a working hypothesis it was considered that these harmful emotions generated through the glands, blood stream or other physical agencies of the body a sort of poison which caused illness or a predisposition to illness.

Leaving to the doctors the problem of finding an antidote for the poisons, an effort was made to find antidotes for the harmful emotions and this proved easier. The beneficent emotions were soon listed to include: optimism, satisfaction, happiness, confidence, assurance, trustfulness, hopefulness, certainty, love, cheerfulness, courage, patience, enthusiasm, conscientiousness, determination and the like.

To build up faith or trust, to inspire hope, to inculcate charity or love as an antidote to selfishness and envy, it was found necessary to bring to the patient some authority of a philosophical or religious nature. In general religion was believed to be the most powerful agent although anything of an inspirational nature was found valuable.

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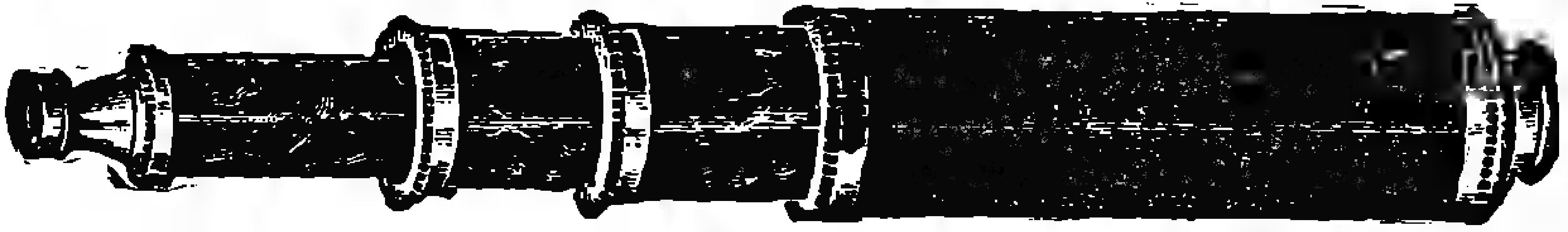

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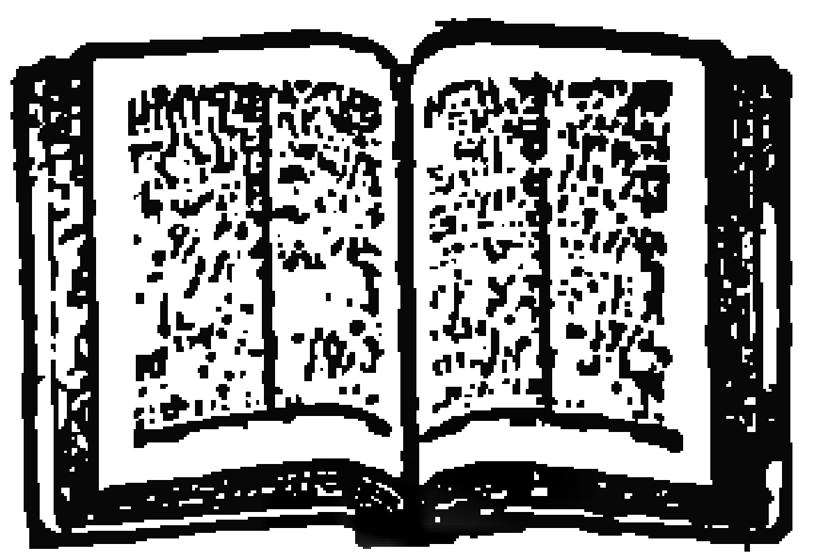

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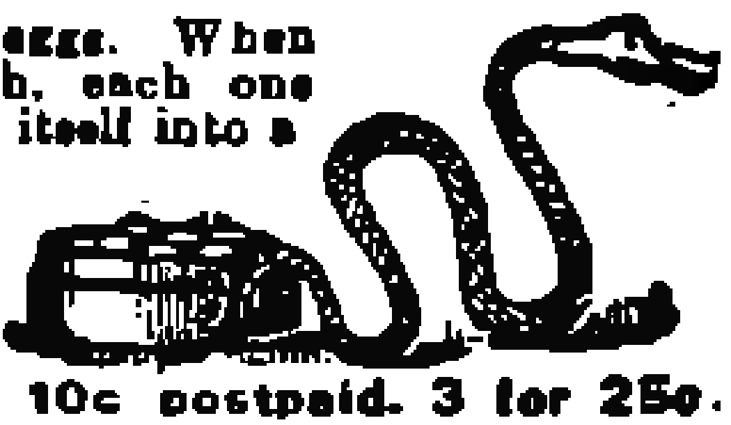

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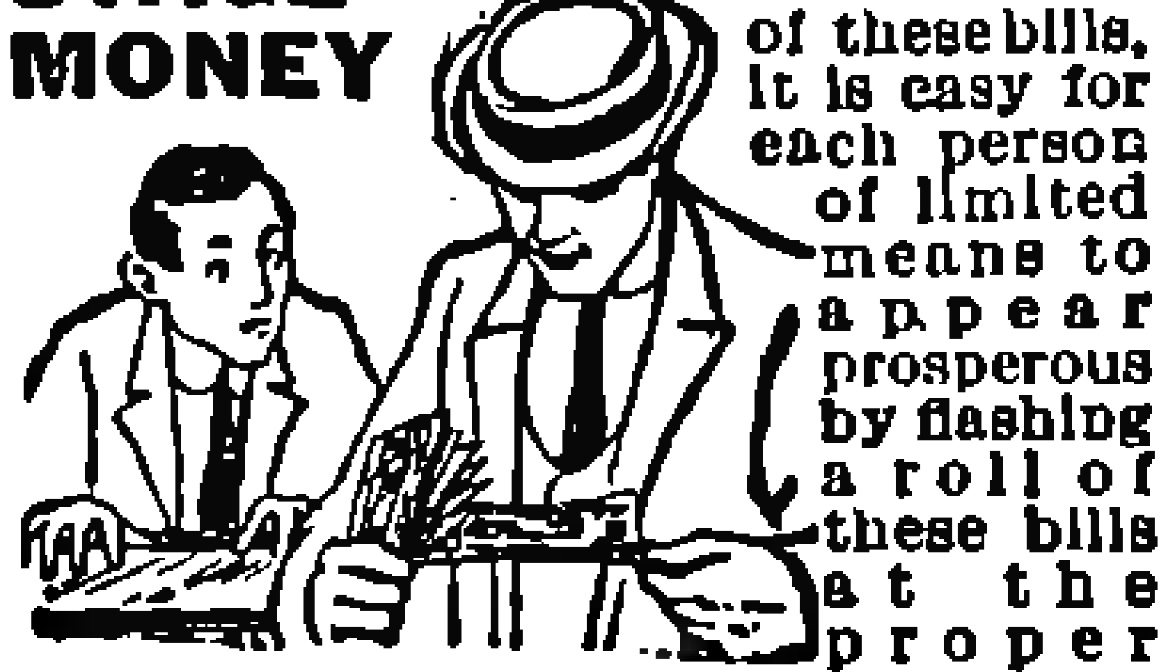

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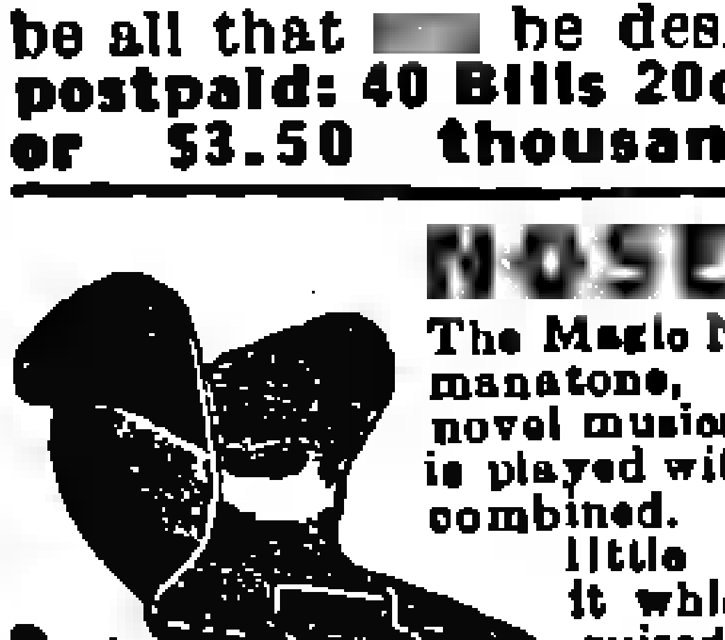

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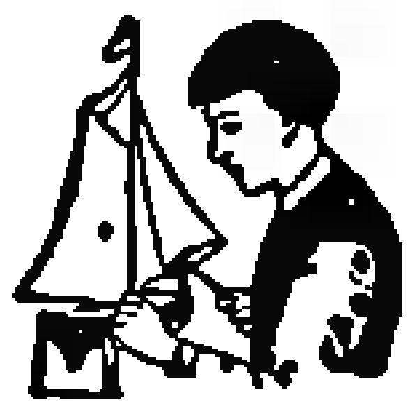

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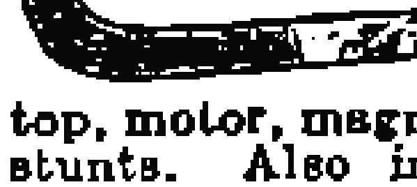

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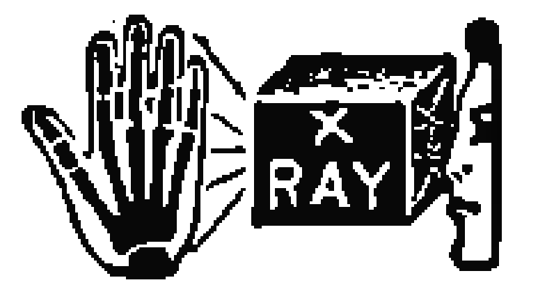

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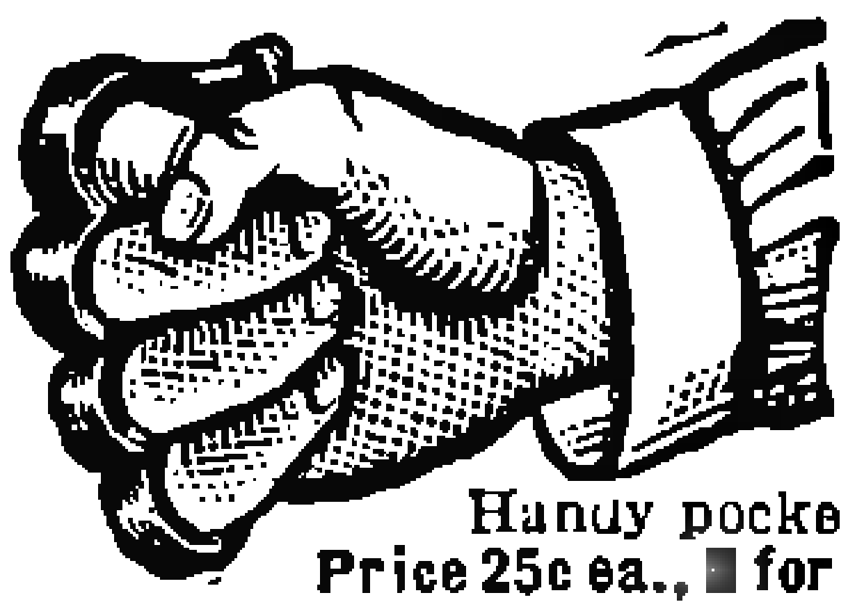

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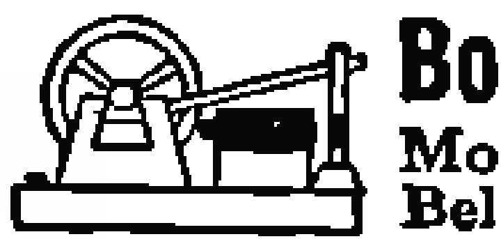

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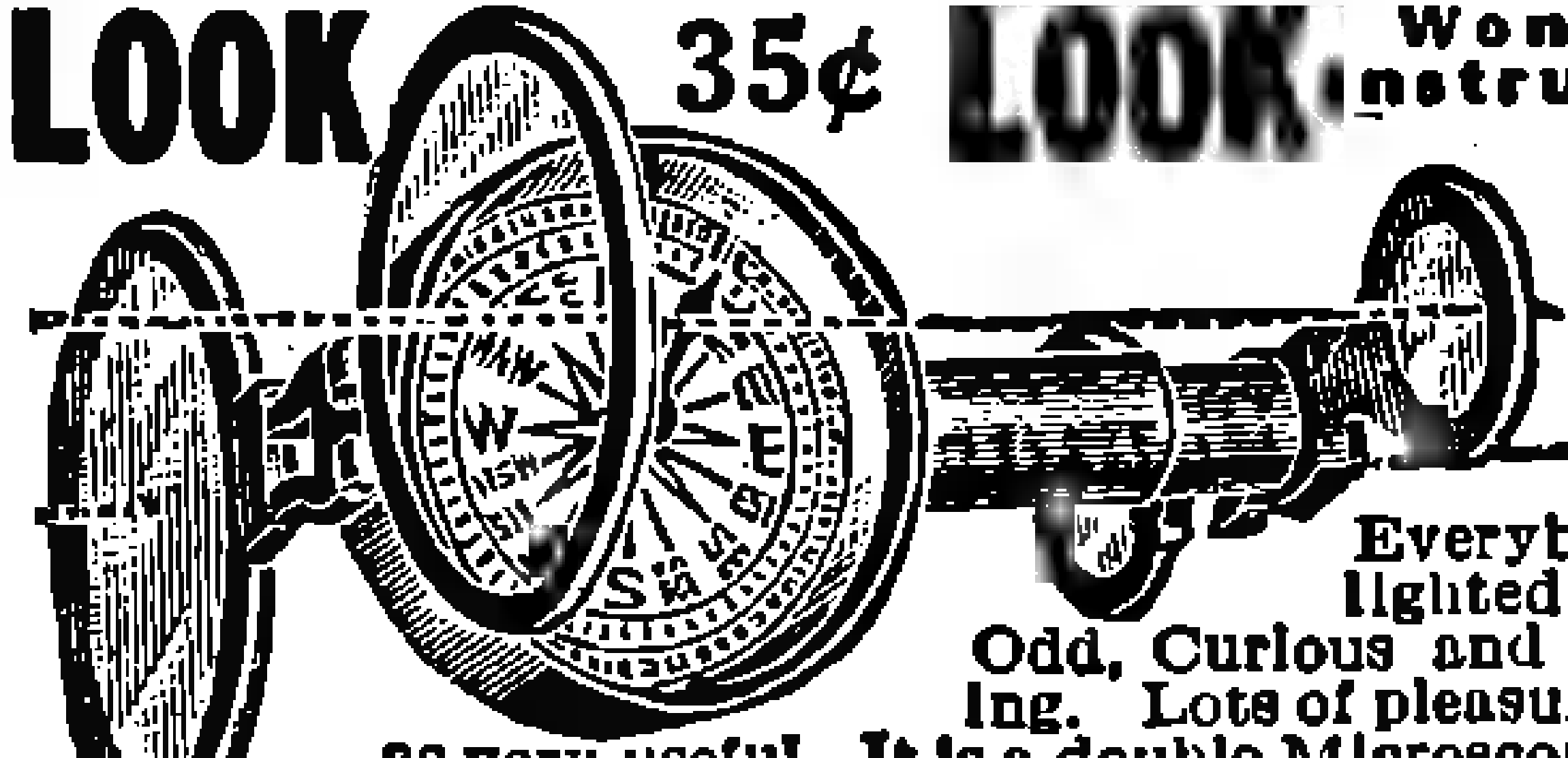

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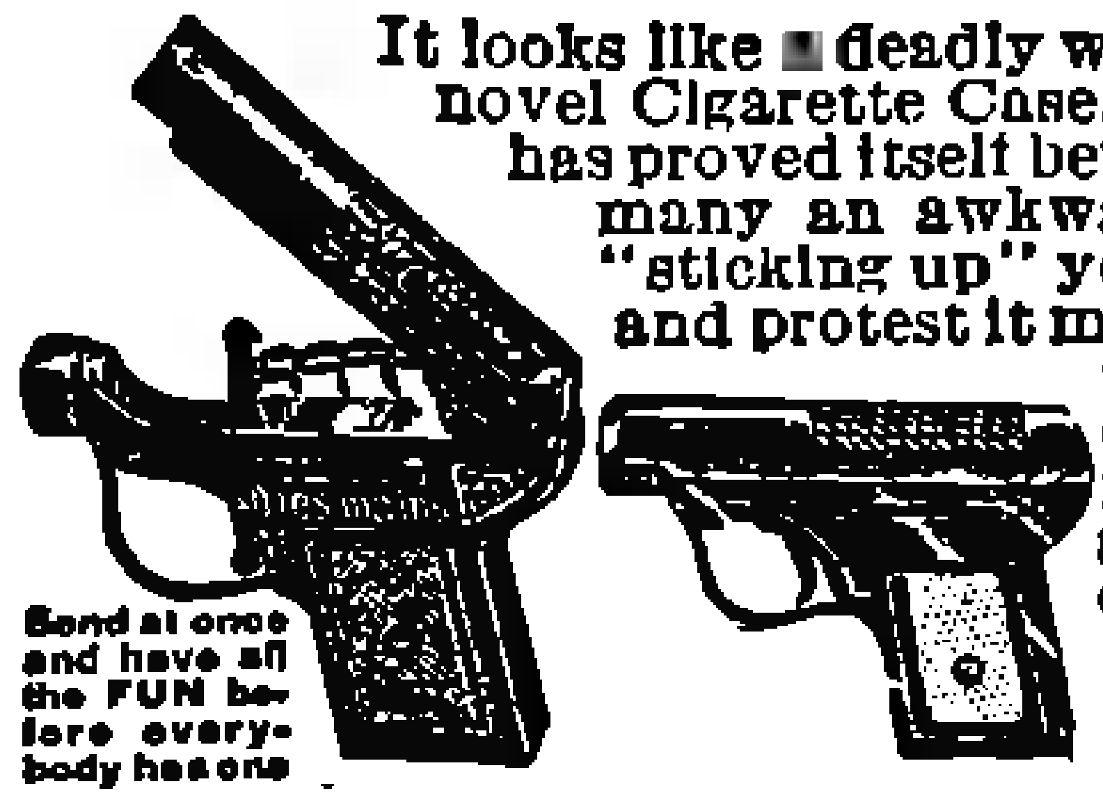

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This remarkable book tells how. Explains all about Hypnotism, how to hypnotize, how to produce sleep, how to awaken [illegible] subject, how to hypnotize animals, hypnotism in diseases, hypnotism for scientific practice, illusions [illegible] halucinations, personal magnetism, thought transference, etc. Written [illegible] plain, everyday language that anybody can understand. **PRICE 10c postpaid.**

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64-page book tells how. Gives the meaning of each and every card, how to deal and lay them out. Everything explained in simple language. **PRICE 10c postpaid.** *770 page catalog 10c.*

LATEST CATALOG

JOHNSON SMITH & CO.

Dept. 919 **RACINE, WIS.**

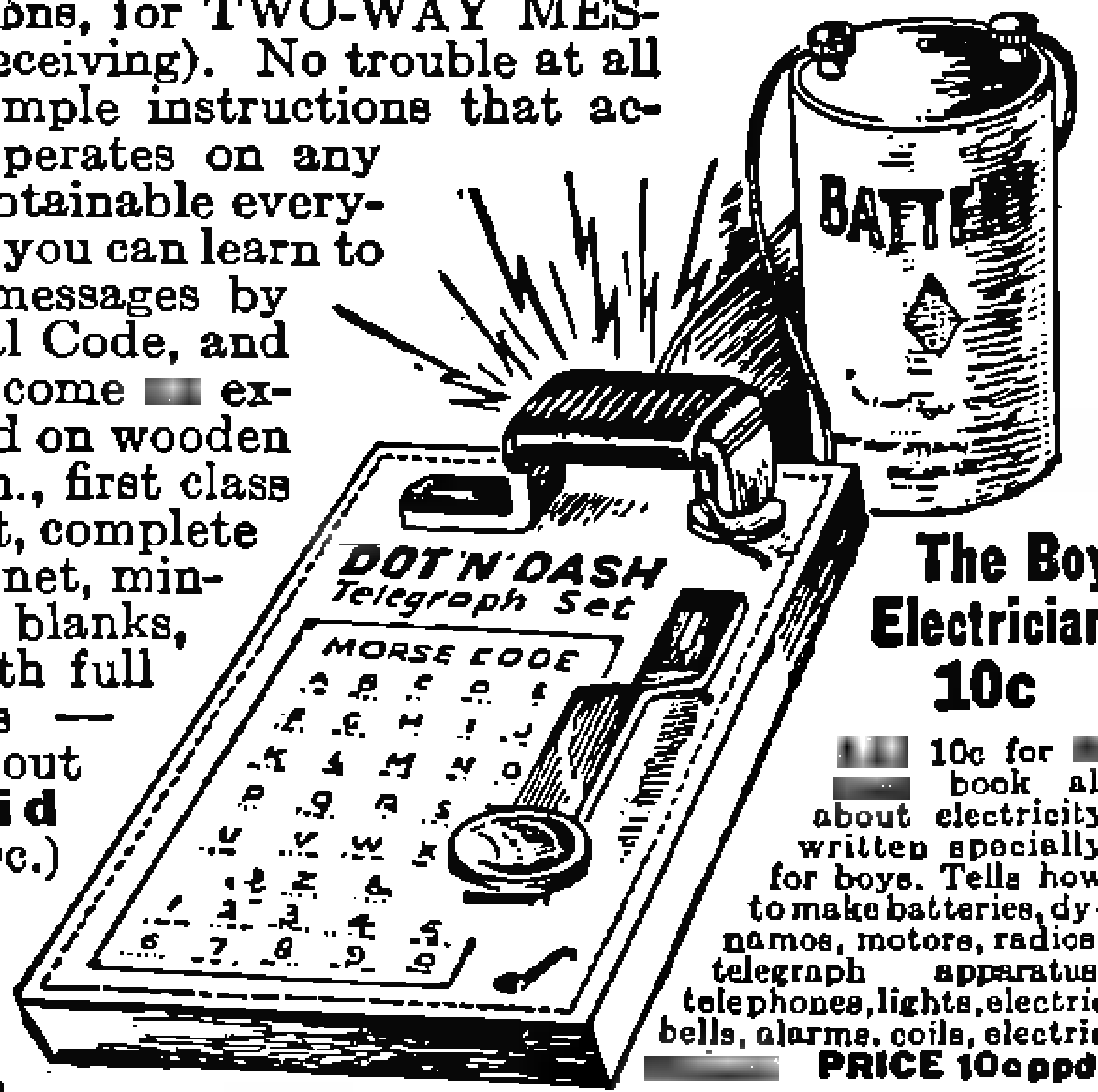
A copy [illegible] our NEW CATALOG mailed on receipt of 10c, or the De Luxe Edition with cloth binding 25c. Bigger and better than ever. Only book of its kind in existence. Nearly 800 pages of all the latest tricks in magic, the [illegible] novelties, puzzles, games, sporting goods, rubber stamps, unusual and interesting books, curiosities in seeds and plants, etc., unprocurable elsewhere. Remit by Coin, Money Order, Check or unused U. S. Postage Stamps, for all articles list[illegible] above. [illegible] money, stamps and Postal Notes accepted at current rate [illegible] exchange.

Address orders for all goods on above and on following page to Johnson Smith & Co., Dept. 919, Racine, Wis.

Electric Telegraph [redacted]

[redacted] A private Electric Telegraph Set of your own for [redacted] Lots of fun sending messages to your friends. Better still get two sets, hook them up [redacted] shown in the directions, for TWO-WAY MESSAGES (sending and receiving). No trouble at all to operate with the simple instructions that accompany each set. Operates on any standard dry battery obtainable everywhere. With this outfit you can learn to transmit and receive messages by the Morse International Code, and in [redacted] very short time become [redacted] expert operator. Mounted on wooden base measuring [redacted] x [redacted] in., first class construction throughout, complete with key, sounder, magnet, miniature Western Union blanks, packed in neat box with full illustrated instructions — **ALL FOR 15c** (without battery) **postpaid** (Canada and Foreign 20c.)

15c



770 page catalog of novelties, jokes, tricks, puzzles, books, etc. 10c.
[redacted]HNSON SMITH & CO.
Dept. 919, Racine, Wis.

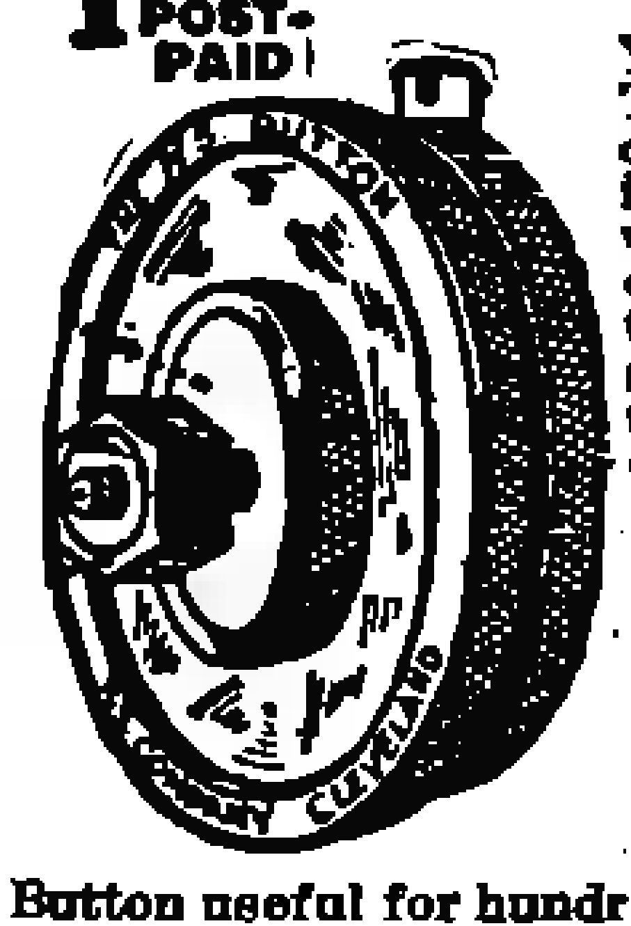
The Boy Electrician 10c

[redacted] 10c for [redacted] book all about electricity written specially for boys. Tells how to make batteries, dynamos, motors, radios, telegraph apparatus, telephones, lights, electric bells, alarms, coils, electric [redacted] **PRICE 10c ppd.**

MICROPHONE TRANSMITTER BUTTON

MUSIC AT A DISTANCE

$1.00 POST-PAID

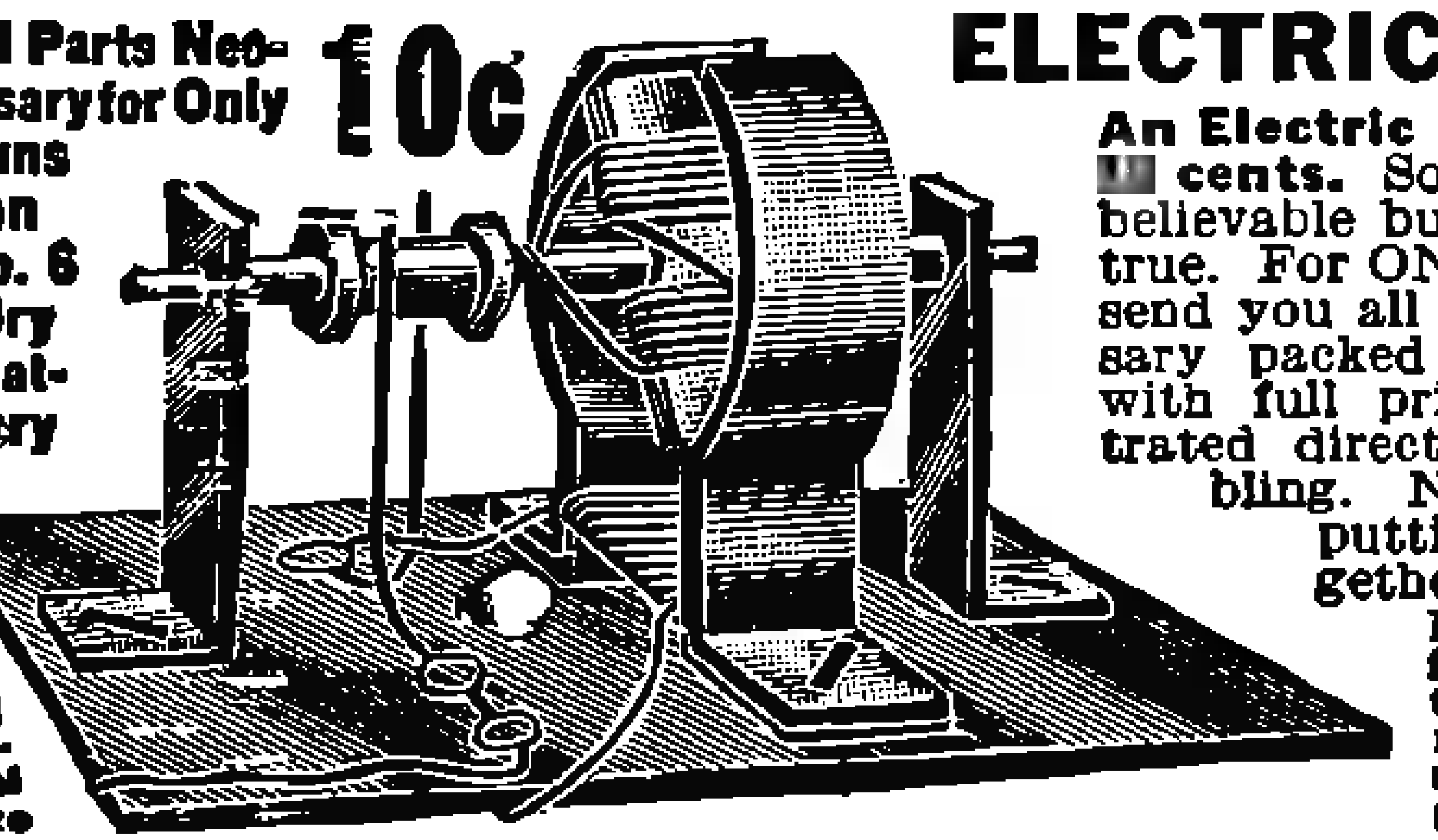


You can easily make a highly sensitive detectophone by using this Transmitter Button to collect the sound waves. You can build your own outfit without buying expensive equipment. It is simple and inexpensive. You can install an outfit in your home [redacted] hear conversations being held all over the house. You can connect up different rooms of a hotel. This outfit was used by secret service operatives during the [redacted] It [redacted] being used on the stage. It is ultra-sensitive and is the greatest invention in microphones. You can mount the button almost anywhere—cardboard boxes, stovepipes, stiff calendars, on the wall behind a picture frame, etc. Button [redacted] so light and small it cannot be detected. Persons [redacted] be overheard without suspecting it. You can listen in [redacted] conversations in another room. A deaf person in the audience can hear the speaker. Connected [redacted] phonograph, piano or other musical instrument, music can be heard hundreds of f[redacted] away. Button may be used [redacted] [redacted] telephone transmitter; often makes an old line "talk-up" when nothing else will. The ideal microphone for radio use; carries heavy current and is extremely sensitive. Amplifies radio signals. Countless other similar uses will [redacted]gest themselves. Experimenters find the Button useful for hundreds of experiments along the lines of telephones, amplifiers, loud speakers, etc. Many fascinating stunts may be devised, such as holding the Button against the throat [redacted] chest to reproduce speech without sound waves. $5.00 is given to anyone who sends in [redacted] new suggestion for the use of the Button providing the manufacturers find it suitable for [redacted] in their literature. **PRICE [redacted].00 POSTPAID.**

ELECTRIC MOTOR

All Parts Necessary for Only 10c

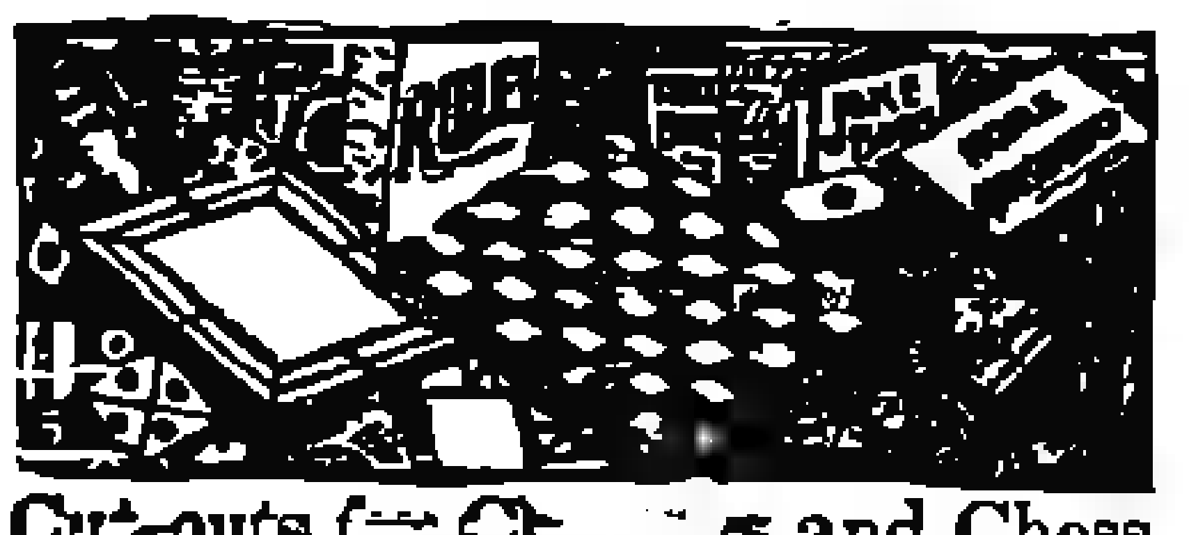
Runs on No. 6 Dry Battery



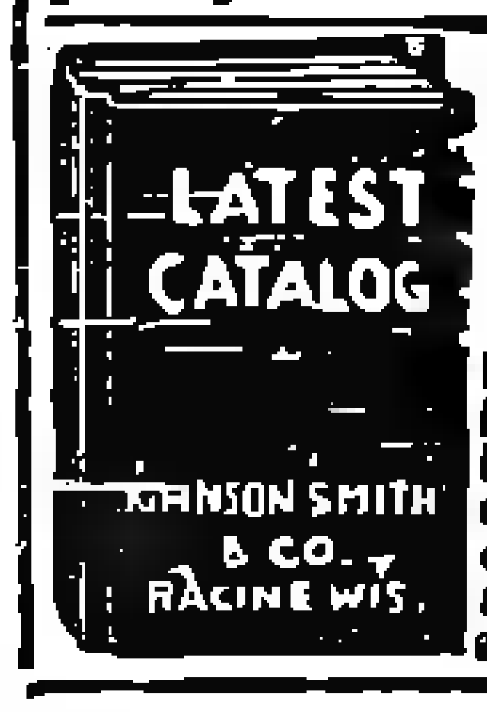
¼ Actual Size

An Electric Motor for Only [redacted] cents. Sounds almost unbelievable but it is perfectly true. For ONLY 10 cents we send you all the parts necessary packed in a neat box with full printed and illustrated directions for assembling. No trouble at all putting the parts together, in fact it is FUN. Just follow [redacted] few simple instructions and in [redacted] few minutes [redacted] [redacted] is ready [redacted] run. **10c postpaid.**

BIG ENTERTAINER



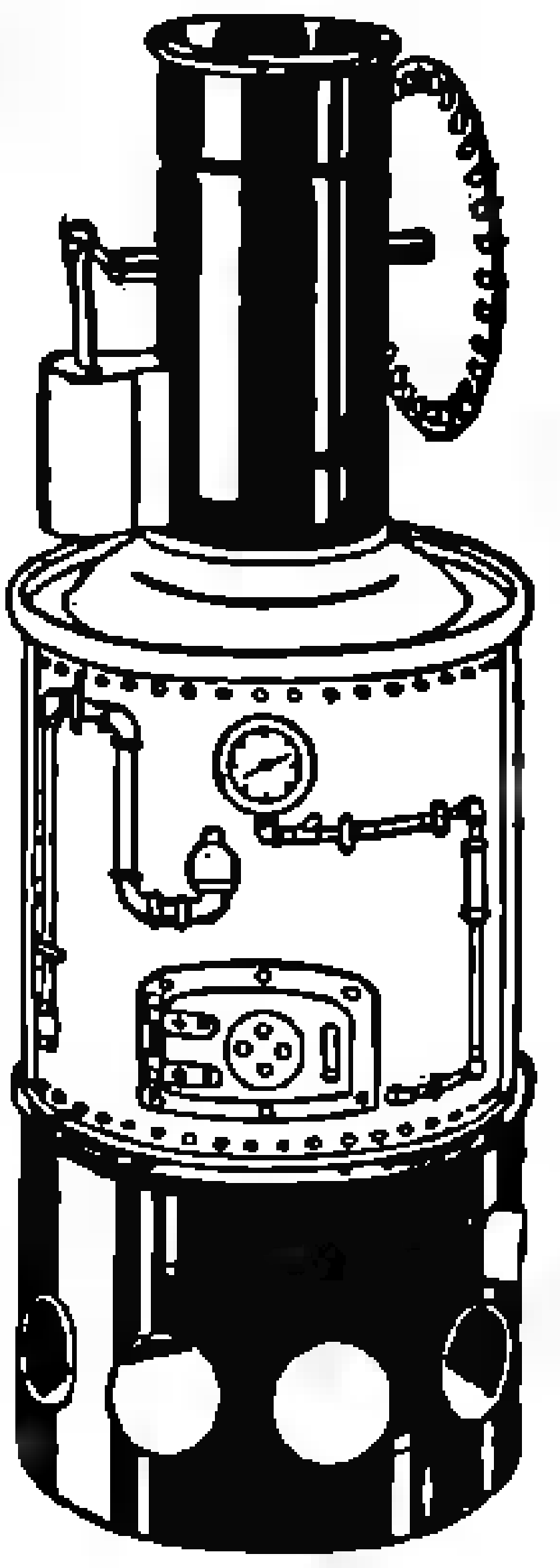
180 Jokes and Riddles, 34 Magic Tricks, 54 Parlor Games, 73 Toasts, 15 Card Tricks, 9 Fairy Tales, 50 Money-making Secrets. 10 Funny Readings, 3 Monologues, 21 Puzzles and Problems, [redacted] Comic Recitations, Cut-outs for Checkers and Chess, Dominoes, Fox and Geese, [redacted] Men Morris, Spanish Prison Puzzle, Game of Anagrams, etc. **All for [redacted] postpaid.** *770 page Catalog of novelties, jokes, tricks, etc., 10c.*


LATEST CATALOG
JOHNSON SMITH & CO. RACINE WIS.

[redacted]HNSON SMITH [redacted]

[redacted] 919, **RACINE, WIS.**

[redacted] copy [redacted] our [redacted] CATALOG mailed on receipt [redacted] 10c., or the De Luxe Edition [redacted] cloth binding 25c. Bigger and better [redacted] ever. Only book of its [redacted] in existence. Nearly 800 pages of all the latest tricks in [redacted], the newest novelties, puzzles, games, sporting goods, rubber [redacted], unusual and interesting books, curiosities in seeds and plants, etc., [redacted] elsewhere. Remit by Coin, [redacted] Order, [redacted] or [redacted] U. S. Postage [redacted], for all [redacted] listed above. Canadian [redacted], stamps [redacted] Postal [redacted] accepted [redacted] current [redacted] Exchange.



STEAM ENGINE

[redacted]C

NEW POWERFUL MODEL JUST OUT
Add 10c for postage [redacted] packing

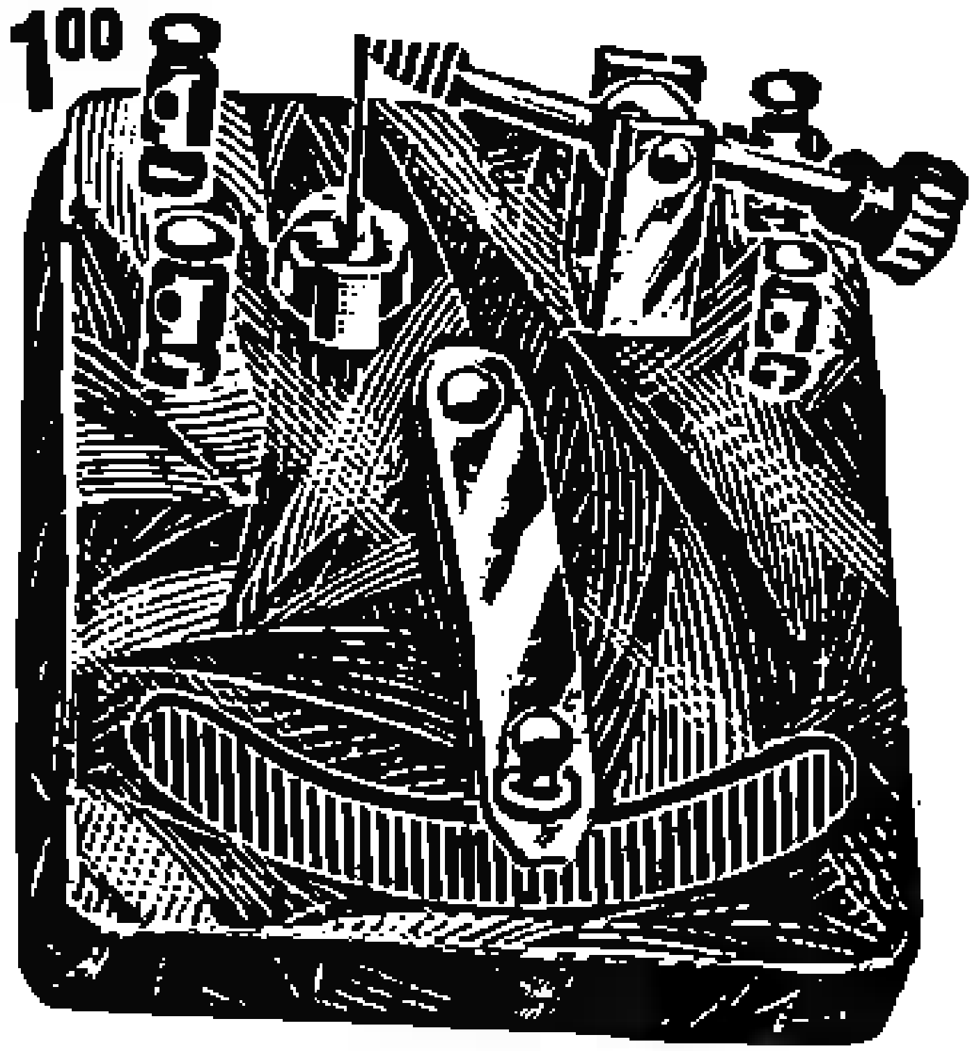
The world's biggest value in mechanical toys. A great big steam engine, measuring 7 inches in height by 2½ inches in diameter (7½ inches in circumference) for **ONLY 25 cents.** You should see it run, too. It's [redacted] revelation to see the fly wheel spin around [redacted] a great rate as soon as you "get steam up." Just light up, fill the boiler with water, and in a few minutes the engine is running at top speed. New model just out, runs on alcohol or canned heat—MORE POWER. Has fly wheel for running small mechanical toys.

GUARANTEED [redacted] RUN

[redacted] [redacted] foolproof, harmless, fully tested and guaranteed to run. A scientific toy that illustrates the principle of the steam turbine. Runs for hours [redacted] one filling of water. Every boy should have one. Wonderfully well made—splendid value for the money. Sells for **ONLY 25c,** with 10c extra for postage and packing. Easily worth double. *Electric Model of [redacted] Engine also available. Price 35c, postage 10c extra.*

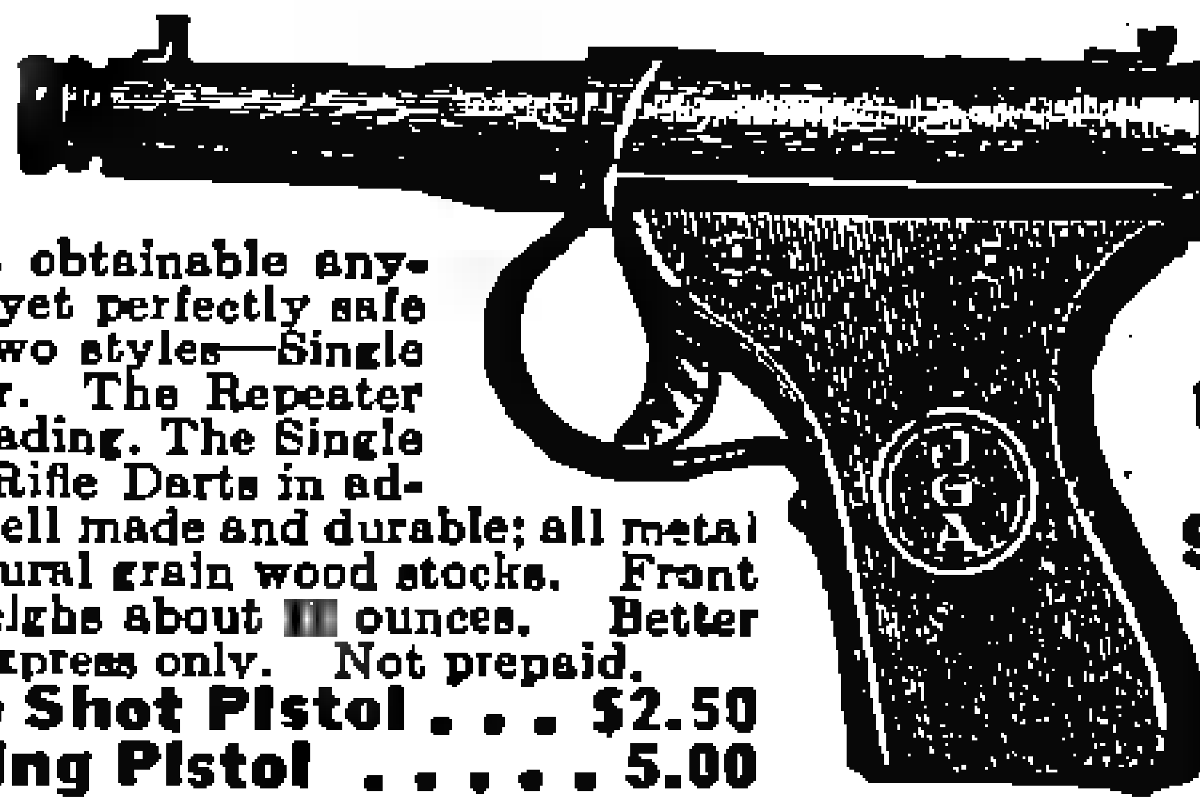
Crystal Radio Receiver, $1.00

$1.00



Say what you will about Electrical and Battery Sets, [redacted] CRYSTAL set has them all beat for simplicity and clearness of tone. There [redacted] absolutely no noise and no distortion—no batteries to buy—no tubes to wear out—no maintenance expense whatsoever. Cost nothing to operate and will last indefinitely. Reception [redacted] loud and clear. This Receiver is guaranteed to work equal to the most expensive Crystal [redacted] you [redacted] buy. Has a receiving radius of [redacted] 25 miles, [redacted] under favorable conditions up to 100 miles. Constructed of the finest materials throughout, including supersensitive crystal, assuring quick results. PRICE [redacted] Receiver only [redacted] **postpaid.** Or complete with Ear Phone and Aerial Kit—everything all complete—nothing more [redacted] buy, **$2.95 postpaid. JOHNSON SMITH & CO., Dept. 919, RACINE, [redacted]**

Single and 100-Shot AIR PISTOLS



Uses BB. Shot

Just what you've always wanted. [redacted] powerful high grade Air Pistol, shaped like an Automatic, pocket size. Fires B. B. shot obtainable anywhere. Very powerful yet perfectly safe for boys to handle. Two styles—Single [redacted] Pistol [redacted] Repeater. The Repeater fires 100 shots [redacted] [redacted] loading. The Single Shot Pistol shoots Air Rifle Darts in addition to B. B. Shot. Well made and durable; all metal parts nickel plated; natural grain wood stocks. Front and [redacted] sights. Weighs about [redacted] ounces. Better than an air rifle. By Express only. Not prepaid.

PRICES: Single Shot Pistol . . . $2.50
100-Shot Repeating Pistol 5.00

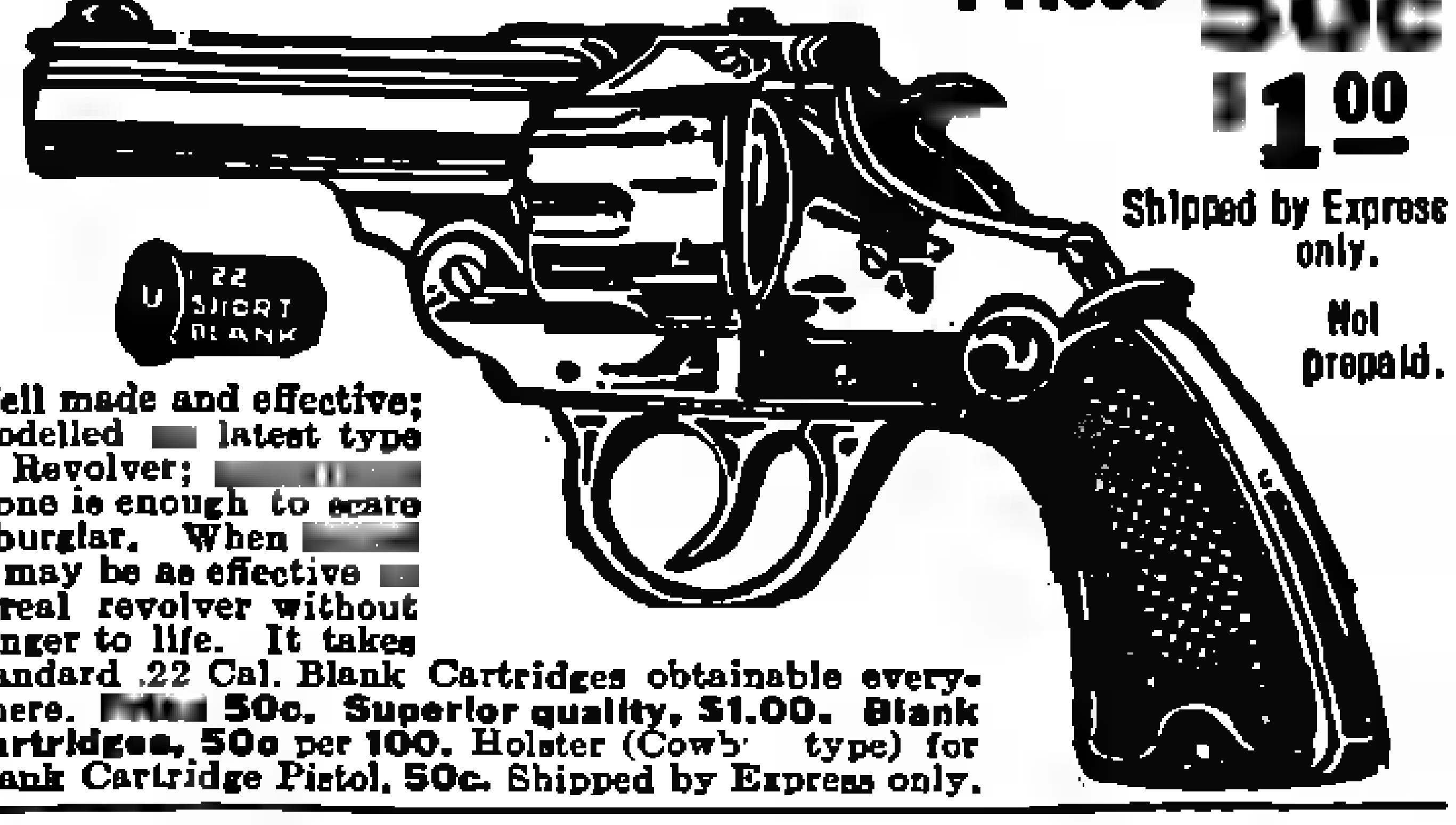
BLANK CARTRIDGE PISTOL

Protection against Burglars, Tramps and Dogs

Prices [redacted]
[redacted]1.00

Shipped by Express only.

Not prepaid.



Well made and effective; modelled [redacted] latest type of Revolver; [redacted] alone is enough to scare [redacted] burglar. When [redacted] it may be as effective [redacted] a real revolver without danger to life. It takes standard .22 Cal. Blank Cartridges obtainable everywhere. [redacted] **50c. Superior quality, $1.00. Blank Cartridges, 50c per 100.** Holster (Cowboy type) for Blank Cartridge Pistol. **50c.** Shipped by Express only.

[redacted] THROW YOUR VOICE

Into a trunk, under the bed or anywhere. Lots of fun fooling teacher, policeman or friends.

THE VENTRILO

a little instrument, fits in the mouth out of sight, used with above for Bird Calls, etc. Anyone [redacted] use it. [redacted] **fails. [redacted] page course on Ventriloquism and the Ventrilo. All for 10 cents postpaid. JOHNSON SMITH [redacted] CO., Dept. 919, RACINE, WIS.**

BLUEPRINTS *New PLANS for the Shop Worker*

Get your copy of Modern Mechanix and Inventions' big Blueprint Book—it's free! Projects shown in the book are the most popular how-to-builds run by the magazine, and on every one of them large size, genuine blueprints are available at low cost, making it easy to build the items in your own shop. Boats, airplanes, trailers, home built autos—take your choice from these and scores of other subjects! Thousands of Modern Mechanix and Inventions projects have been built from these blueprints; they're the cream of all how-to-build articles published during the past five years. A few of the plans are listed below:

NEWEST PLANS

ESKIMO KYACK—Simple little one-man rough-weather canoe, completely covered except for space where paddler sits, making it practically impossible to swamp. Construction is simple, layers of tough kraft paper, bound with varnish, being used for covering. Tested and designed by Sam Rabl. Price of blueprints $1.00

DIVING HELMET—With this helmet, constructed of odds and ends which cost but a few cents, you can explore lake bottoms as deep as 30 feet. A fascinating new world opens up before your eyes. Money can be made with it, too, recovering outboard motors and other objects lost in the water. Blueprints $1.00

ELECTRIC REFRIGERATOR—Blueprints show you exactly how to construct an electric refrigeration unit, and printed directions supplement the diagrams. At a cost of around $40 you can construct an electric unit for your icebox that serves as efficiently as a manufactured model costing five times as much. Blueprints . . $1.50

SCRAM—Newest addition to the boat plan list. She is 15½ feet of dynamite, inboard motored—will do around 40 with Ford A engine. Forward and aft cockpits, with motor between. Can be built in a garage, and is a flashy performer. Prints include drawings for marine conversion of Model A Ford motor. Blueprints $3.00

AUTOS

BUNGALOW TRAILER — The most popular trailer design ever published; thousands have been built. Two wheeled, folding design—folds together compactly for traveling, can be opened up in camp. Weatherproof; built-in beds for four adults; running water, household comforts. About $30 should build her—much less, if you have a few parts lying around. Wheels and axle from most any discarded car chassis will do. Blueprints $1.00

M-M SPORT ROADSTER—Custom-built to your own fancy! Four-cylinder motorcycle engine, chain drive, wood frame, Model T Ford differential unit, four wheel brakes. With these cheaply acquired units, the car does 65 m.p.h. Body of fabric construction, easy to work. Blueprints $2.50

M-M SPEEDSTER BODY—Racing body for a Model T Ford or similar chassis. Wooden frame, wire covered, then a layer of cotton batting held down by imitation leather. Blueprints $1.00

AIRPLANES

AIR CAMPER—Pietenpol's masterpiece, the most popular light plane for amateur construction ever designed. Two place, model A Ford motor, high-wing monoplane. Costs $500 to build, including motor. Thoroughly tested out in cross-country service. Prints give conversion details for Model A motor. Blueprints $7.50

SKY SCOUT—A smaller Air Camper, single place, using Model T Ford engine. Designed for easy building, safety rather than speed. Wood fuselage. Blueprints . . $4.00

GERE SPORT BIPLANE—The leading light biplane design. Suitable for Model A Ford motor. Single place, rarely beautiful in appearance; an Army pursuit plane in miniature. Steel fuselage. Blueprints $5.00

BOATS

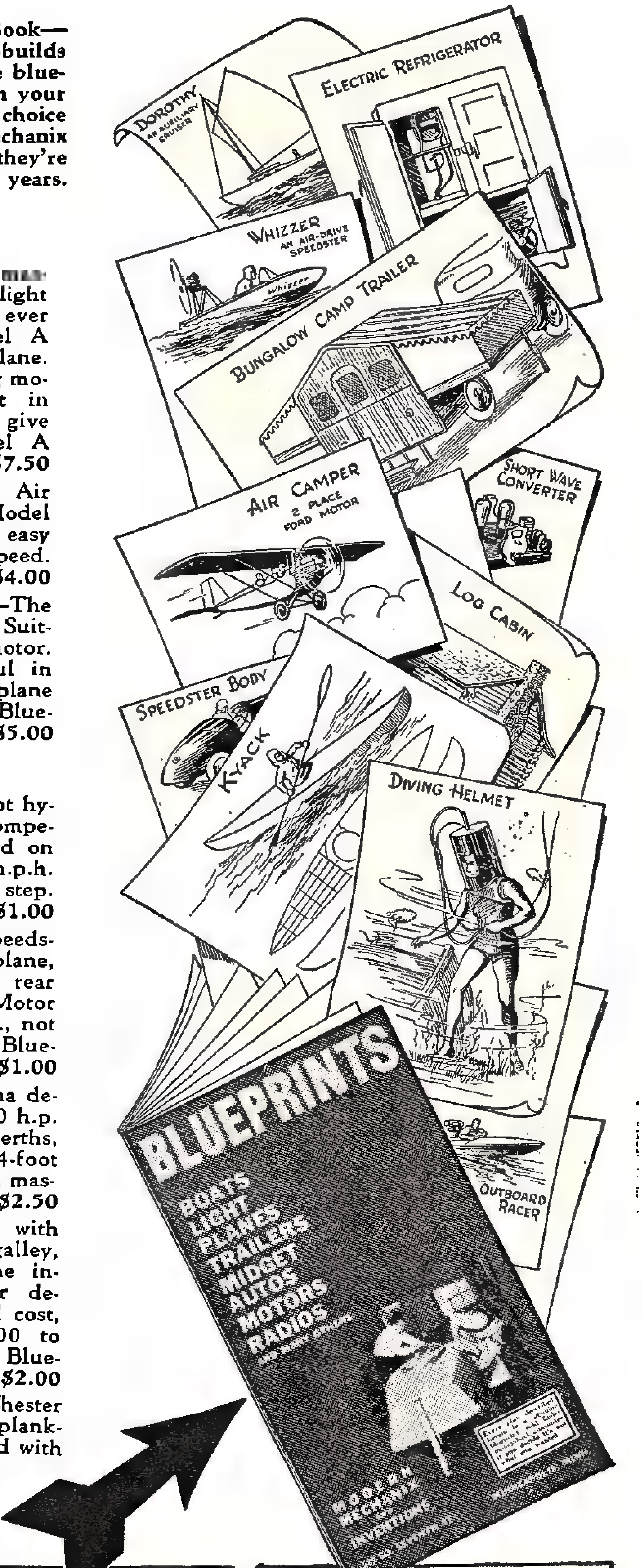
PUNKIN SEED—An 11-foot hydroplane that cleans up in competition with the right outboard on her stern. Capable of 45 m.p.h. Concave V-bottom with one step. Blueprints $1.00

WHIZZER—An air-drive speedster, one step scow type hydroplane, driven by air propeller at rear with motorcycle engine. Motor should be of at least 20 h.p., not over 125 pounds weight. Blueprints $1.00

DOROTHY—A John Hanna design, auxiliary cruiser with 10 h.p. motor, two sail plans. Two berths, five-foot headroom in her 24-foot hull. A deep water boat by a master designer. . Blueprints . . . $2.50

GANNET—24-foot cruiser with bunks for two, complete galley, nicely boxed-in Ford engine installation. A very popular design by Charles Hall. Total cost, including motor, from $300 to $500, depending on locality. Blueprints $2.00

CANVAS CANOE—By Chester Nedwidek. Length, 16 ft., planking of 5/32 in. cedar covered with No. 8 canvas. $15 should turn out the complete job. Blueprints $1.00



MODERN MECHANIX AND INVENTIONS, 529 S. Seventh Street, Minneapolis, Minn.

Gentlemen: Please send me my copy of the big new Blueprint Book by return mail. This comes to me without the slightest obligation.

I enclose $. . . . . in payment for blueprints of. . . . .
(Note: This form can be used if you wish any of the prints listed above without waiting for the descriptive booklet.)

Name . . . .

Address . . . .

City . . . . State. . . . .

ANDY'S SHOP MAIL BOX

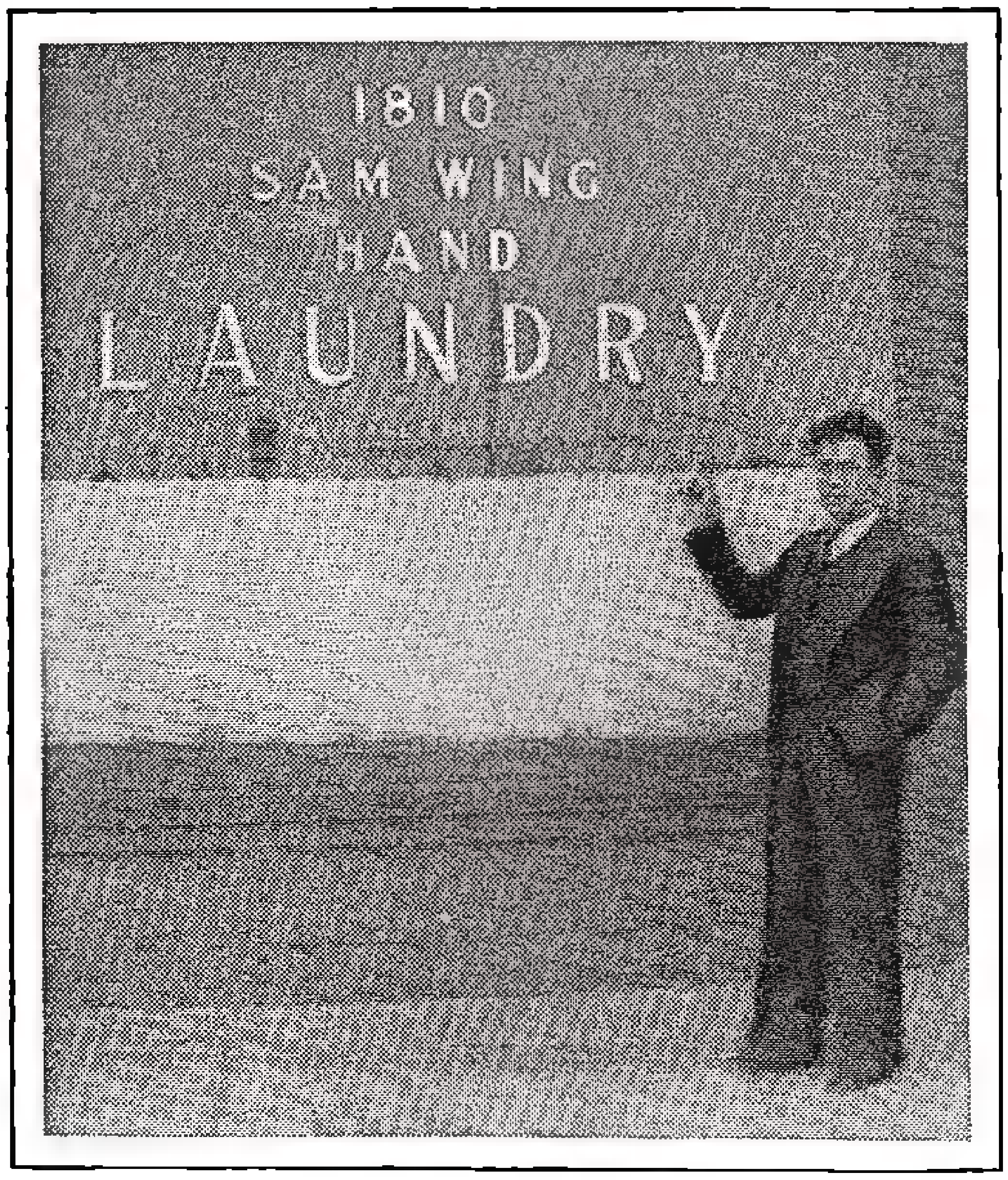
(Continued from page 12)

wood-sawing outfit built by my brother and myself about a year ago. The power plant is a Reo 4 cylinder engine, and the trailer on which it is mounted is a 1926 Essex chassis, shortened up, and a lead pole attached.

Because of the simplicity of construction and the fact that various makes of motors and chassis can be used for building the rig, I thought that this project might be of interest to some other M.M. fans. If this can be of any use to you, I can furnish a set of plans, and give the details on the construction. The machine can be built at a cost of not more than $25.00, including tires for the trailer.

If you cannot use this idea, please turn the photos over to Andy's Shop Mailbox. Andy may find some use for them.

Yours truly,
Arthur E. Brown.



No, Our Sam Wing does not run this de-buttoning establishment. A friend in Ava, Illinois, has sent us the shot so we can deny it.

Bill Bartlett of Ava, Illinois, wuz in t' Chicawgo th' other day an' saw a Chinee Laundry run by a guy named Sam Wing, who is probably saving up punched money t' git back to China in his ripe old age. Bill sent me a letter that I'm runnin' while Sam is acrost the field dingin' up a model boat at the edge of th' lake:

Ava, Illinois.

Dear Andy:

Enclosing an interesting and illuminating insight into the intimate industrial inclinations of one Sam Wing, your competing contemporary on the vacationing Packmag personnel. This de-buttoning establishment is to be seen on West Addison, in the Windy City.

And now, Andy, as one prodigal pelican to another, I might as well tell you how to end

(Continued on page 18)

PATENT
your ideas

Small Ideas May Have Large Commercial Possibilities

If you hope to realize profits from your invention, you must protect it with a U. S. Government Patent. Otherwise, you may find that all your time and labor have been lost, because it often happens that other inventors are working on the same idea. IF YOU HAVE AN IDEA, TAKE STEPS TO GET A PATENT AT ONCE! Your first step is to get my FREE BOOK. It tells you in simple, plain language just what you must do, how you must proceed in order to secure Patent protection.

I Serve You in Secrecy

You can communicate with me in perfect confidence. Any drawings, sketches or letters you send me will be kept in strong, steel, fire-proof files that are accessible only to authorized members of my staff. I have served inventors located in every state in the Union. My service is prompt, careful, efficient. Your first step—the move you should make today—is to SEND THE COUPON FOR MY FREE BOOK.

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"Record of Invention" FREE If you act promptly I will send you this valuable Record of Invention blank absolutely FREE. It may help you to prove your right to your invention later on.

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(IMPORTANT—Write or print plainly.)

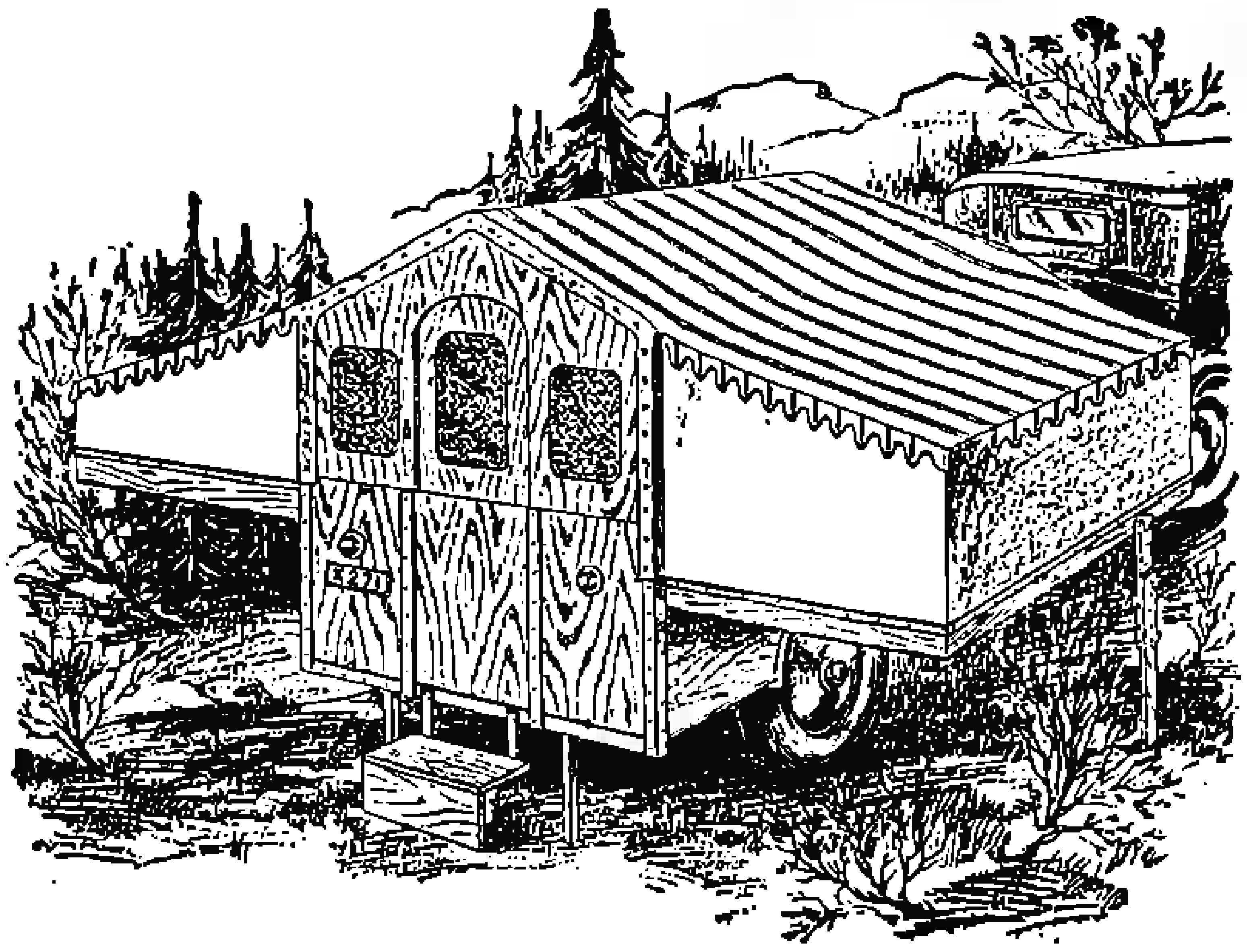
●●GOLD BUYERS WANTED

We pay the highest prices and send spot cash by return mail for discarded Jewelry, Gold Coins, Dental Gold. Old Watches and Rings, Plated Articles, Silver, Platinum, etc.

WE WANT MEN EVERYWHERE to act as our local buying agents—Good pay—Positively No Selling. We teach details and finance purchases. Write today.

C. J. CLARK REFINING CORPORATION
109 N. Wabash Ave. Dept. D-8 Chicago, Ill.

Build This GYPSY Trailer *for* Vacation Time!



This Bungalow on Wheels

- ***—sleeps four adults***
- ***—costs $30 or less to build***
- ***—folds up to car width when on the road***
- ***—carries all household equipment, including running water and built-in beds.***
- ***—is completely weatherproof***

NO WONDER this trailer has proved to be the most phenomenally popular how-to-build project in years! Literally hundreds of them have been built since the plans originally appeared in the May, 1932, issue of Modern Mechanix and Inventions. The illustration above shows the outfit in camp for the night, unfolded as a house. For traveling, the side balconies are folded inward, the roof top down, and presto! you have an easily towed trailer which allows complete vision from the rear window of your car.

BLUEPRINTS show the trailer layout with all dimensions. Prints are large size, specially made for shop use, easy to read. Any man who can tell a hammer from a saw can put this trailer together to last for years. Price of blueprints, postpaid **$1.00**

Modern Mechanix and Inventions
529 S. Seventh St. Minneapolis, Minn.

ANDY'S SHOP MAIL BOX

(Continued from page 17)

the depression in the magazine business and please our discriminating, although nearly forgotten brother-under-the-skin, Mr. G. L. Farrar. Here's the dope. Each month, I suggest you run a picture of a gorgeous gum-grinding Gertie at the head of your column (blondes by preference, with an occasional brunette thrown in for variety). And perhaps a few dozen closeup views of a bathing beauty contest in a ————colony would go well with your clientele. No doubt other patient perusers of your putrid punk will agree with me. I believe this would please all, from our fastidious friend Farrar, down to myself, who each month meanders metropolisward, and trickles through ticklish traffic, to slap my hard earned nickel and dime down on the newsstand line—all this for the rather doubtful privilege of browsing over your enigmatic epidermics. I don't doubt but what this will coax Prosperity from around that chronic corner, and sic 'im onto the seat of the circulation manager's pants.

Going, going, gone,

BILL BARTLETT.

I'm running the pix, Bill, to prove for all time that our Sam Wing is an Englishman and not a de-buttoner with almond eyes. Gotta make a memento of some sort. Sam'll thank me for this favor.

* * *

From 'way up in Camrose, Canada, I have received this script from Bill Gardener. (Wonder if he knows, being a boat fan, that one of the best naval artichokes who ever lived was named Wm. Gardener?) Well—

Dear Sirs:

Would it be possible to send one of these booklets to Mr. J. Pratt, of Camrose who is also interested in boat building.

Together we built a very successful "Sun Ray" sloop last year and later we intend to each try another type.

The "Sun Ray," despite many pessimistic opinions turned out good and we had a lot of fun out of it. It sure sailed fast and on tacking in a good wind it would come around like a well trained horse on a gallop.

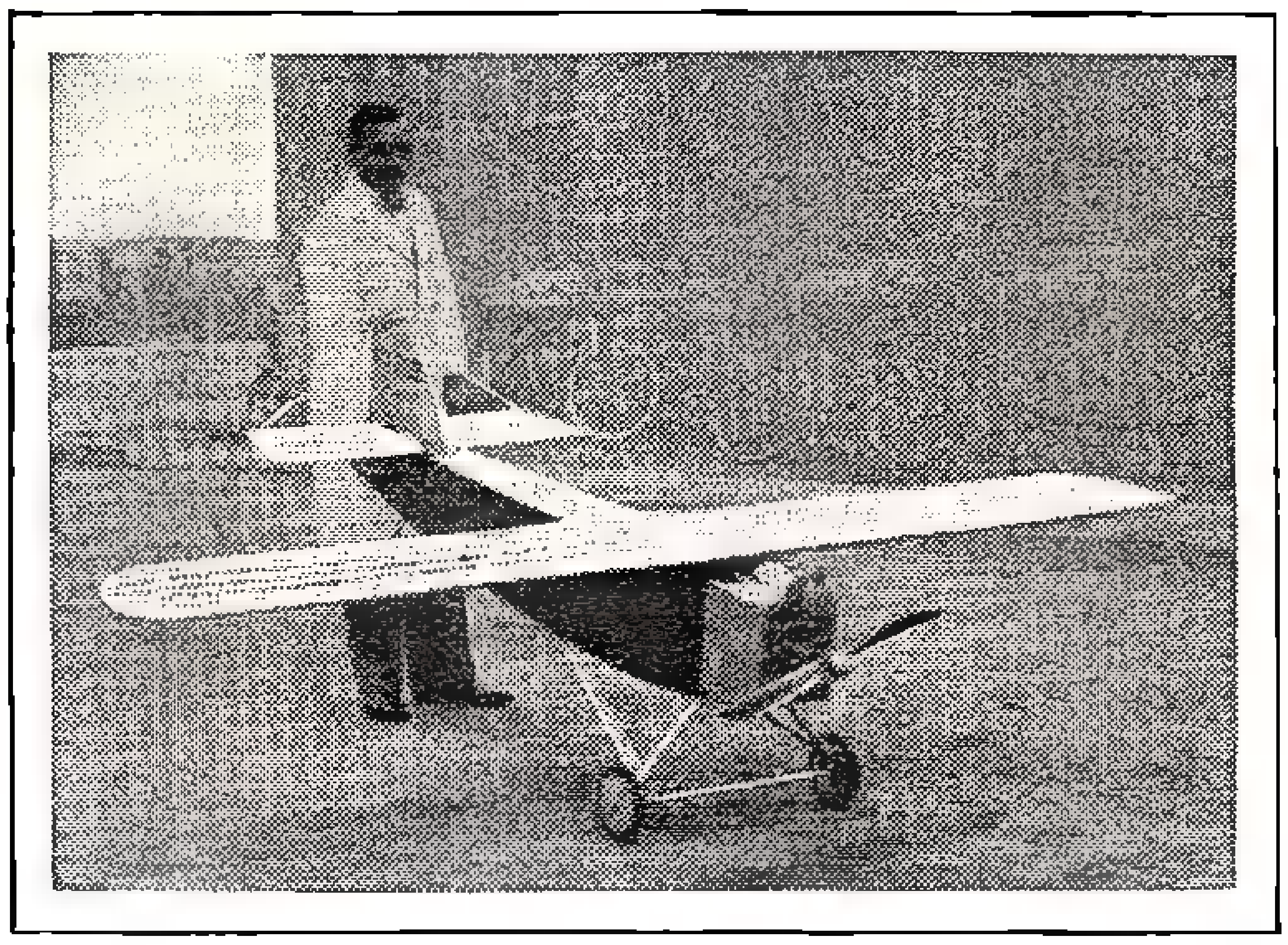
Your plans are as complete as it is possible to be and so plain that anyone can read them. We find that the greatest requirement was patience. It took most of our spare time after work for six weeks to complete it, but it was worth it.

Hoping you may oblige, I remain,
Yours truly,

Wm. E. Gardener,
Camrose, Alberta, Can.

That gives you an idea of what "Sun Ray" can do and how long it takes to build her. She can be had in plan form in our How to Build It book, available at this office, ahem, for fifty cents.

ANDY'S SHOP MAIL BOX



Much experimenting is being done with minature gas powered airplanes that really fly. Here is one built by Juniors of the Pasadena Technical High School. One horsepower.

Up above you will see a sweet little monoplane built by members of a Junior class in a Pasadena high school. This little ship is to be powered with a small one-lung two-cycle engine similar to the Wall engine "Mighty Atom" which ran complete—plans and all—in the Packmag, Issue No. 1. I got a letter from a lad in New Jersey recently (just a short one) telling me his gas powered midget had flown out of sight and was found wrecked three miles from the Teterboro airport.

1000 Ways to Make a Living

(Continued from page 77)

of wood about four inches by six. Next to each picture he places a small pad of paper, a calendar, or a thermometer to increase its usefulness.

Farm Exchange Business

Starting with an old touring car a farm worker in Pennsylvania has built up a really "big business." He hired neighbors to pick huckleberries and blackberries that grew wild in his territory, then sold them on a commission basis in towns near by. From this business he made enough money to buy a truck to handle all kinds of farm products. Soon he was covering over two hundred miles of territory. Then he got an agency for farm implements, taking part pay in farm products. All farmers, he says, have something they want to sell for whatever they can get, and you can sell it if you work hard enough.

Furniture Painting Shop

Almost every home has some piece of old furniture which could be made colorfully attractive with a fresh coat of paint or enamel. One man sent out form letters soliciting the work of painting such furniture and soon had all the work he could do. He carried color cards with him and suggested color schemes and decorations. The work at first was usually done right at the customer's home but, when necessary, he took the furniture to his own workshop at his home. At first he used brushes exclusively, but business increased to a point (he now makes $35 to $50 per week) where he had to buy a paint sprayer to enable him to work faster.

This Magic Box

Turns Spare Time Into Money! Up to

$40 a Week!

without Leaving the House

We show you how to make big money decorating fast-selling Giftwares and start you off with the big, complete $10 Artist's Outfit shown above. Also Free Idea Book that has started hundreds of men making big, easy money. One Fireside Member says, "I made $100 on furniture in one week." Another writes, "My sales were $500 for 5 weeks. This is my first year." R. M. P., of Illinois, says, "I did $3500 worth of business last year and over $12,000 this year." D. W., New Mexico, reports, "I would not take $1000 for my Course." If you really want to make big money, a *guaranteed income* opportunity is now ready for you with Fireside. No tiresome study. You learn by doing. You make good money practically from the start. Our FREE Book tells you how. Send the coupon for it.

NO SOLICITING—NO CANVASSING

It's easy to dispose of everything you make. Our new "Automatic Salesman" does all the selling for you. This vendor is designed to quickly find cash buyers for **all the Giftwares you can turn out! No soliciting or house to house canvassing required under this method.** Nor do you need any artistic ability in order to succeed. Simple "3-Step Method" makes the work easy to learn and easy to do. Under new Plan your membership need not—**should not**—cost you a penny. Get full details. Coupon brings everything.

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Getting More Light on the Moon

(Continued from page 61)

R. W. Wood, of Johns Hopkins, who has photographed portions of the moon with color screens and plates sensitive to different regions of the spectrum. Comparison of the photographs with those made of sulphur-coated rock in the laboratory shows almost certainly that there are deposits of sulphur on the moon.

As sulphur is often found in the materials ejected from volcanoes, Prof. Wood's discovery supports the old idea that the thousands of so-called craters on the moon are the vents of extinct volcanoes, but there are some serious objections to this idea and a different one is now favored by many authorities. The moon is undoubtedly hit by millions of meteorites every day, and some of these bodies are certainly big enough to make conspicuous scars on its surface. Even the earth, though well protected by its atmosphere, is now known to be scarred in many places by meteoric bombardment as witness the long-famous Meteor Crater in Arizona.

Bullets have been fired into a little leaden moon by some investigators and craters have been produced very similar in appearance to those seen in lunar photographs. The terrific impact of a big meteorite, traveling at enormous speed, would produce enough heat to melt and volatilize the rocky surface of the moon over a large area.

Here we have a possible explanation of the long white "rays" that extend for hundreds of miles from some of the larger craters and have caused more controversy among astronomers than any other feature of the moon's surface. These rays may have been formed by the splashing of molten rock when an exceptionally large meteorite hit the moon.

One of the first uses made of the Mount Wilson telescope already mentioned—the largest in the world—was to take a series of photographs of the moon, which revealed hundreds of craters and other details previously unknown. At the same institution a remarkable campaign of lunar mapping has now been undertaken by a committee of the Carnegie Institution.

The new system of mapping employed at Mount Wilson consists of taking numerous sectional photographs of the moon, which are projected by means of lantern-slides and concave mirrors upon the surface of a small globe coated with magnesia powder, as illustrated.

All objects appear on the globe in their true shapes and positions and photographs made from the illuminated globe give an accurate map. A contour map of the moon is also being made by a process of stereoscopic photography similar to that used in mapping the earth from an airplane.

It is, of course, well known that the lunar attraction, combined with that of the sun, causes tides in the ocean and also in the solid crust of the earth, and some seismologists believe that it plays a part in causing earthquakes. Many of the other effects that the moon has been alleged to exercise upon the earth, including the control of weather, are mere "moonshine."

One remarkable and mysterious influence, however, has recently come to light. Studies by H. Munro Fox and other biologists show that a number of living organisms, particularly marine animals, exhibit a lunar periodicity in reproduction. Thus a species of sea urchin living in the Red Sea always spawns at full moon, and the palolo worm, living in Pacific coral reefs, spawns once a year exactly at the last quarter of the October moon.

This curious coincidence of reproductive activity with the moon's phases appears to be well established but has not been satisfactorily explained. Perhaps, after all, there is something in the old idea that moonlight stimulates human love-making!

Finding Cleopatra's Fabled Emeralds

(Continued from page 65)

the mysterious history of the "flames of the devils."

The Tuaregs explained to me that sometimes at night, while lighting their campfires, tremendous flames surged up. These strange fires caused consternation among these primitive children of the desert. They did not realize the truth of the matter, namely, that no doubt sparks from their fires sometimes light up petroleum wells, which situation is common enough in Pennsylvania.

Oil in the Sahara? I have no doubt any more about that.

At some geological epoch centuries ago the Sahara was a part of a vast, interior sea, where layer after layer of petrified fish gradually accumulated, forming itself into oil, just as was the case in the great American petroleum regions. What a treasure to contemplate if some great nation or business concern would investigate the petroleum situation throughout the vast Sahara wastes.

But to return to our expedition. After many more weary days of march in the desert's scorching sun (just how many days is hard to say since we lost track of time) we reached our big objective—Garama, once the ancient capital of the Garamantes, whose kingdom was among the Sahara's most powerful, in early times. I humbly believe that this discovery remains unique in the records of ancient finds in Africa. We had found the greatest Paleolithic walled city ever known to modern science—with walls [illegible] feet high and eight feet across, surrounding an area of three square miles.

Very thoroughly, considering our limited time and funds, we explored this ancient city, discovering countless grottos whose statuary will no doubt throw important light on the problem of man's origin in North Africa besides thousands of practical remains of a mysterious and novel civilization—such as carved stone implements and curiously wrought flint artifacts.

Our discoveries in the city were a prelude to the discovery of the gems of Cleopatra in the subterranean chamber in the hill near by. After my find the expedition continued its excavations in the city of Garama and brought to light hundreds of relics of immense value to archaeology.

Our work finished here, my next objective was to return to civilization and raise enough funds to explore the fascinating region further. True it is that once away from Africa, I long to return as soon as possible to the desert land of gold and sand and ruin.

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A Telescope for "Star Gazing"

(Continued from page 117)

tamination with the previous abrasives. This *is* important!

Polishing is done on a pitch tool or "pitch lap." This is prepared [illegible] follows: Place the mirror and tool in a dish of water and gradually heat to [illegible] temperature of about 125 degrees. Meanwhile melt your pitch in another receptacle but do not let it come to a boil. Pour a bit of the pitch on a scrap of wood and let it cool at which stage if you can just crease it with your thumb nail it is of the proper hardness; if too soft continue heating until some of its low temperature fractions are evaporated and test again; if too hard, add a few drops of turpentine but remove it from all proximity to the flame when adding turpentine! When the pitch is of the desired consistency remove the tool from the warm water and place it back in its working position between the cleats and pour pitch on the convex surface of the tool.

Next, having previously mixed some rouge in water to a consistency of cream, take the mirror from the warm water, paint its concave surface with the rouge and press it firmly and vertically down on the pitch-covered tool; work it about very slightly, just enough to allow the surface of the pitch to conform to the shape of the mirror —this condition can be observed through the upper surface of the mirror—then put the mirror back in the lukewarm water.

The surface of the pitch-lap must now be given polishing facets.

This is done with a hack saw with the result as illustrated above Fig. 2. The facets do the polishing and the grooves provide ventilation so cut the grooves deep and V-shaped. The facets are about an inch square and it is imperative that the grooves be [illegible] laid out on the surface of the pitch that no one facet, or no intersection of grooves, occupies the center of the tool—therefore the "design" is something less than an inch off-center. Next, put the pitch-lap back in the warm water until it has attained the same temperature as the mirror, then put the pitch-lap back in its working position, paint the surface of the mirror with the rouge and place it back on the facets of the pitch-lap and weight it down to an extent of about twenty pounds and let remain until the pitch is cool. This will insure that the facets of the lap have been brought back into conformity with the surface of the mirror in the event they were disturbed by the grooving with the hack-saw. Proceed now with the polishing, using the same motions as in grinding.

To produce a curved surface most mathematically and actually precise for [illegible] telescope mirror it has to be depressed [illegible] few millionths of an inch in its central area which changes the surface from spherical to paraboloidal; necessary because a parabolic curve is the only mirror surface which will bring all parallel light rays to a single and accurate focal point. This is accomplished by wearing away the center more than the edge by using the longer stroke in the final polishing. Needless to say it is useless to hope to work within such infinitely fine tolerances unless one has means of testing the surface of the mirror for variations as fine as two or three millionths of an inch.

A Telescope for "Star Gazing"

One "grab-bag" combination of such apparatus is clearly illustrated near Fig. 6. The test is known as the Foucault Shadow-test and the simple requisites for it are as follows: A light source consisting of a frosted or opal light bulb; a tin can shield for the light and suitably supported around the bulb and having a ¼-inch or so hole punched in it opposite the center of the bulb; over this hole is clipped or fastened a piece of tinfoil with a very fine needle hole puncture; so much for the light source. The other accessory is a knife-edge or razor blade supported as illustrated—and that's all!

The condition of the mirror and the exact shape of its curve at various times during the polishing and the final parabolizing is found very accurately by this Foucault knife-edge or shadow test. The schematic and optical arrangement for conducting this test is depicted simply in Fig. 6. The mirror is supported on edge (after being thoroughly washed of all rouge) and at a distance from it equal to its center of curvature or spherical radius the light source is positioned on a level with the center of the mirror and an inch to the right of its projected center. The razor blade is at the same level and is manipulated just to the left of the mirror's axial center. The operator's position in relation to the apparatus in conducting the shadow test is illustrated just above.

The light, shining through the pin-hole placed near the center of the sphere of which the surface of the mirror is a small part, is reflected back to a point of light close to the pin-hole source. If the eye is placed at this point the mirror will appear as a brightly illuminated disk. Now the razor blade is slid into the line of sight from the left and cuts across the converging bundle of light rays at a point just in front of the eye. If the razor blade is cutting across the reflected rays inside the center of curvature, or "R", Fig. 6, it will cause a shadow to move across the face of the mirror in the same direction as the knife edge is moved. If the reflected rays are cut outside the center of curvature, the shadow appears to move across the mirror opposite to the motion of the razor edge. From these two observations the true center of curvature or exact "R" may be found and measured. If the surface were perfectly spherical, the mirror would appear to darken uniformly when the rays are cut at the exact center. Since the curve is not absolutely exact, faint shadows will appear on it, indicating certain areas of the surface a little plus or a little minus from a true sphere. By careful polishing, these irregularities of the surface can be controlled, so that the curve may first be made as spherical as possible and then deepened just perceptibly in the center. The end result, a slightly parabolic curve is attained when the shadowgraph shows an apparently depressed center and edge, resembling in shape the well known "life-saver" or a flat dough-nut.

Silvering

The glass, which is now ready for silvering, must first be thoroughly cleaned. This process of depositing a thin film of silver on glass is such a delicate one that a minute amount of grease or

(Continued on page 27)

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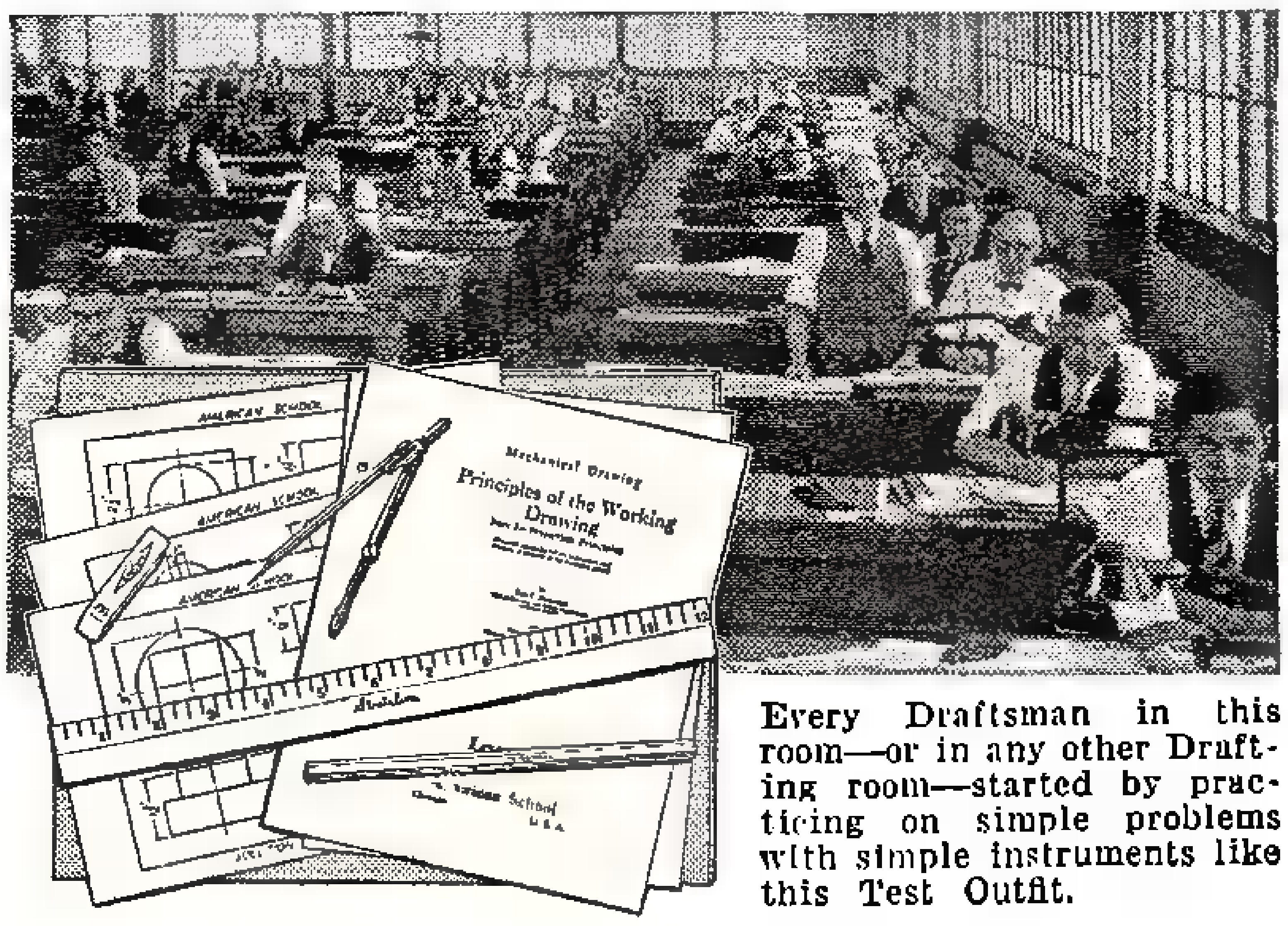

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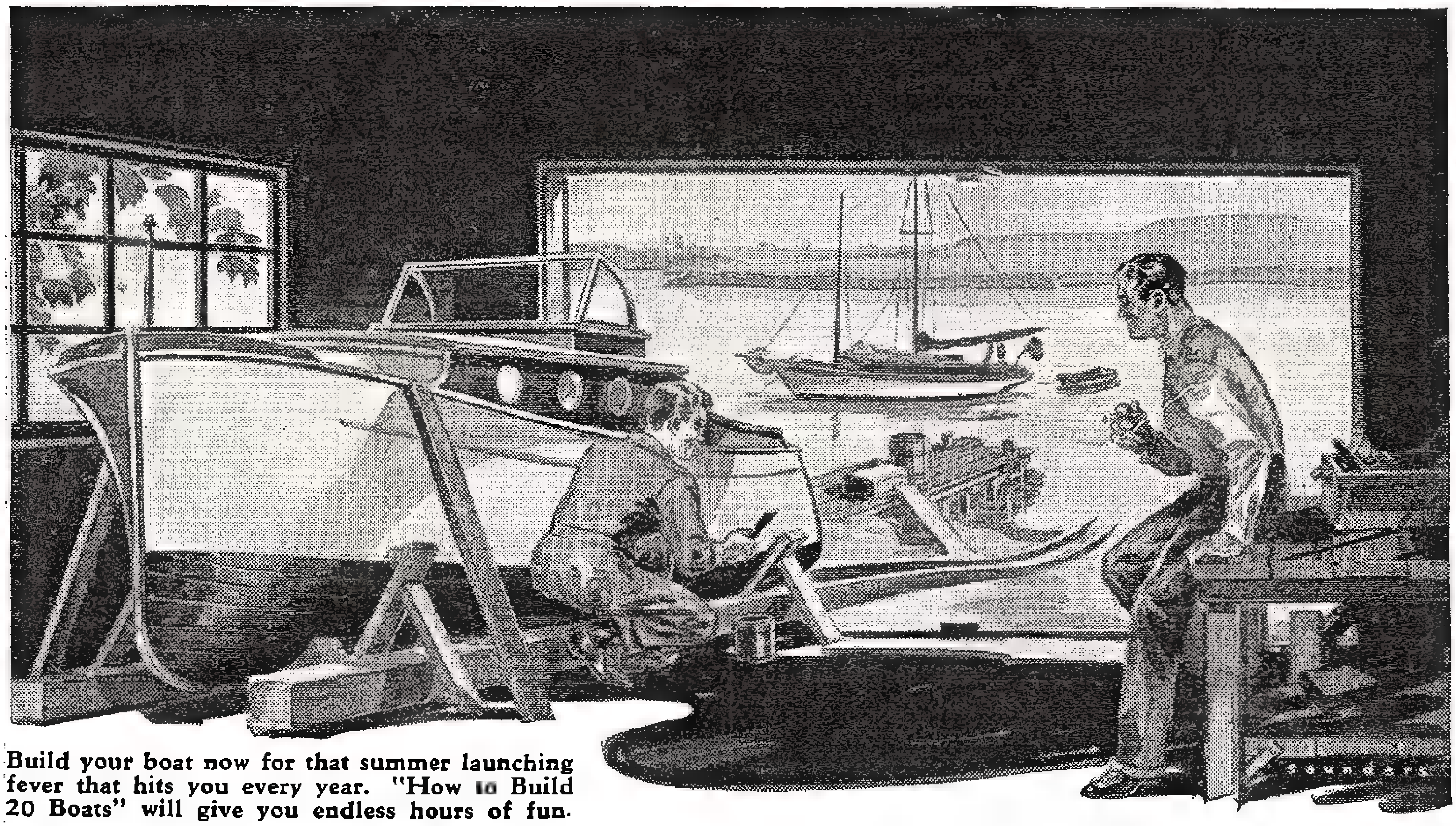

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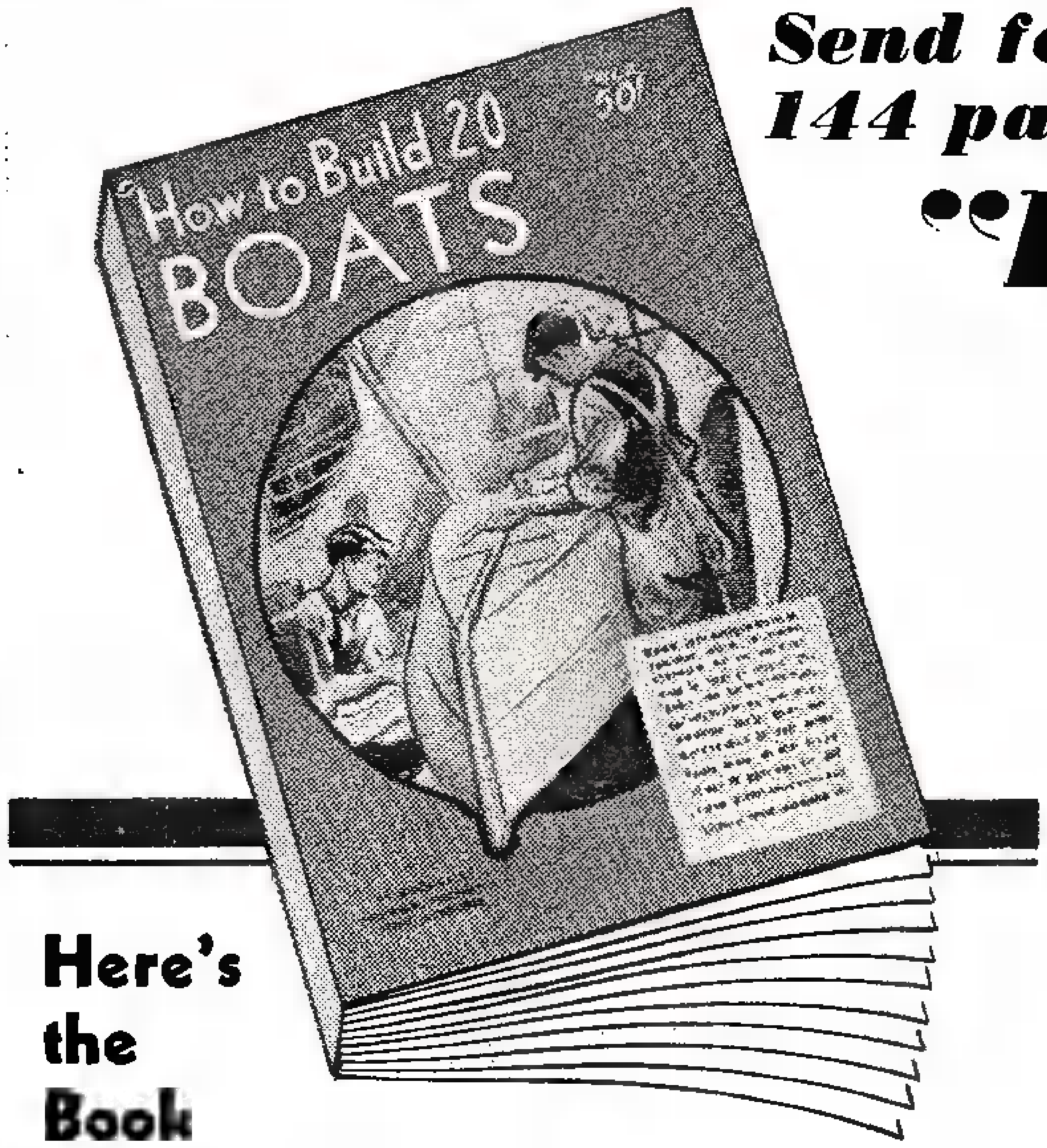

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A Telescope for "Star Gazing"

(Continued from page 25)

foreign matter may greatly mar the finish. The surface is cleaned with alcohol, rubbed vigorously with cotton, and washed with strong acid followed by strong alkali, and finally thoroughly rinsed with distilled water.

An alkaline solution of silver nitrate, containing just enough ammonia to form the silver-ammonia complex, is reduced by simple sugars to metallic silver which deposits on the glass as a very thin film. A strip of paraffined paper may be wrapped around the edge of the mirror to form a wall or dam, and the silvering solution poured directly into this. The silver will deposit in a few minutes, depending on the temperature. As soon as the process is completed the mirror is washed, for the surface will appear bleached if allowed to stay under the silvering solution too long. The film of silver should be protected with a transparent film of diluted lacquer.

Assembly and Mounting

The most frequently described and cheapest for amateur construction invariably are mounted on wood backbone assemblies and consequently are far from rigid and tend to vibrate when touched or when in a slight breeze. The design presented herewith for Modern Mechanix and Inventions readers gets away from such ailments in a fool-proof and positive manner, i.e., by employing pipe fittings for the mounting of the telescope. The complete lay-out was shown in part 1, last month, and is quite self-explanatory. The only critical dimension involved is the one labeled: 50″ minus the * * etc. * *. This needs studying because of the varying values which may occur in the dimension "X" in the same diagram, as no two builders would get the 8-inch octagonal mirror cell positioned exactly the same distance from the 1½-inch pipe forming the main longitudinal member of the telescope.

The side diagram gives the remaining details of mounting and assembling. The mirror is backed by a disk of sponge-rubber cut from a kitchen "kneeling-pad" procurable in any dime store; this in connection with the three wing-nuts allows the mirror to be centered exactly on the little 45-degree diagonal mirror at the other end of the tube. The one-inch magnifying lens used for the eye-piece is mounted as shown in detail. A piece of wood stock is fashioned as shown for holding the eye-piece and the brass brackets which in turn support the smaller block of wood holding the little flat mirror at a 45-degree diagonal. The eye-piece block proper is made from a 1½-inch square stock and the most important and original feature of this design is the end of this block which is turned down to a dimension which allows it to fit into the end of a 1½-inch pipe.

The final alignment of the optical system is attained by removing the eye-piece lens and sighting through the eye-piece lens hole at the 45-degree diagonal mirror. In that little mirror will be seen a reflection of the large mirror and in the large mirror an image of the small one. This latter image should be in the center of the large mirror; if it is not the large mirror can be correctly adjusted by means of the three wing-nuts around the cell.

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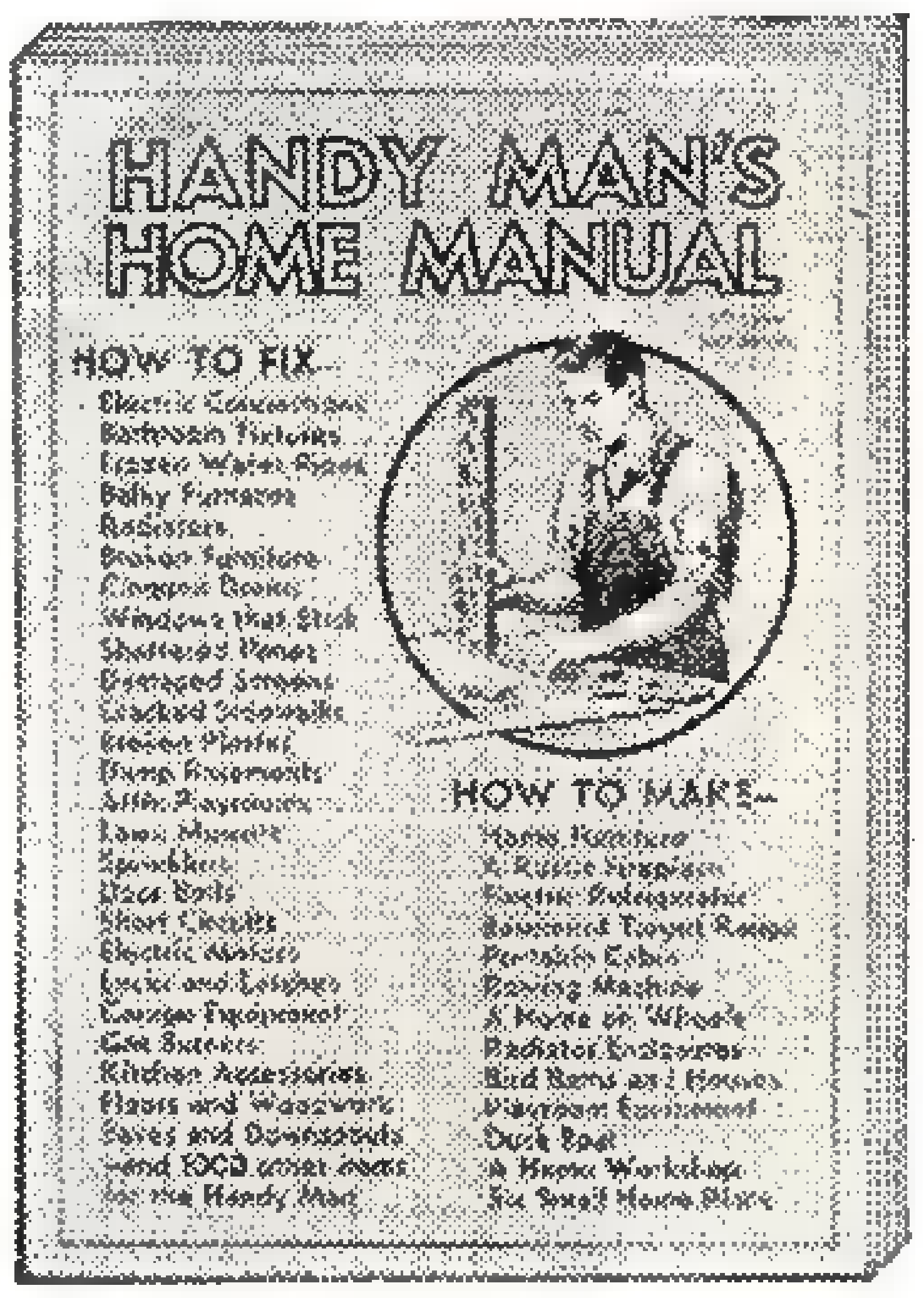

Plans for a Dirt Track Racer

(Continued from page 108)

been mounted in the frame with the transmission in position and for this reason the overall length is not indicated in the drawing.

Standard Model T axle shafts are not strong enough to stand the tremendous buffeting given these units when the racing car is driven at high speed. For this reason it is necessary to make use of smaller roller bearings in the housing and heavier shafts. These may be secured from the racing car parts supply house or the Model T truck shafts may be used and turned down to fit the bearings, using the smaller rollers. Some of the speed merchants are making use of the late model Chevrolet rear axles.

The hubs used in this design are Dayton wire wheel, provided with taper bore to fit the axle shafts used. The wheels are 17x5.50, giving a larger tire with better traction at the rear.

The brakes used on this job are external contracting, fitted over the Model T brake drums and being controlled by means of a hand lever connected to a cross shaft, receiving at its outer ends the flexible cable which runs to and controls the contraction of the brake band and the drum.

For cars of this type it is necessary to secure a racing type steering gear. This is illustrated in the several figures, the one shown being of Ross manufacture. The steering wheel recommended is a flexible spoke wheel. It may be secured from the manufacturer. Sometimes these are fashioned from a circular saw steel blank. These may be worked out in the home shop, although it is quite a chore. If this work is undertaken the blank or spider should be provided with a rim and hub, the hub to fit the shaft of the steering gear and the rim being of a size designed to come just within the cowl of the body. Note that the steering gear is mounted on several brackets which are made from angle iron. The leg of the angle iron is turned out and bolted to the frame side member, other brackets (usually furnished with the gear) being bolted to the vertical section of the bracket. The Pitman arm and drag link are usually secured with the steering gear, although it may be necessary to make up the latter owing to the fact that the location of the steering gear affects the length of this.

Although hydraulic shock absorbers may be used with success on the dirt track, most of the boys still hold to the Hartford type. These are set up quite tight so that there is very little action of the springs. The best practice is to mount the outer ends of the shock absorber arms as near the road wheel position as possible. This is claimed to be better practice than the method illustrated in the photos of the car shown.

In the case of the car shown the transmission is a Model A, in which the second speed cluster is special, having a higher ratio. By means of this higher ratio it is possible to speed up the car quite rapidly in second gear, thus effecting a rapid pick-up and get-away. The clutch used is a multiple disk Model A Ford, as is also the flywheel which has been turned down to approximately half its original weight. Inasmuch as the engine used in this car is a Fronty Ford, which is designed around the Model T block, it is necessary

Plans for a Dirt Track Racer

to have a special bell housing to fit the Model T block and the Model A transmission, assembling and aligning them thereto.

It is not the purpose of this article to go into the construction of a race car power plant. The reason for this is that many Model A or Model T conversions can be mounted in a frame of this type. Many circumstances direct the building of an engine and individual preferences are not always the same. As a matter of fact, this particular car frame has had mounted within it several Model T conversions, the one shown being a motor driven for many laps by Gus Schrader and purchased from him last season by Don Campbell.

The radiator, which is approximately 13 inches wide and 25 inches high, is provided with a 4-inch core and is manufactured by the Peters Cartridge Co. The shell is approximately 13 by 26 inches and is the product of Dryer of Indianapolis. Circulation of the water is by pump. Four water outlets are provided on the top of the engine and four inlets on the side. The manifold pipe is so baffled on the side of the engine as to give equal distribution of the cooling water to the cylinders. The engine temperature is indicated by a Boyce indicator, mounted on the steering column.

One feature which occasions all beginners in this field much trouble is the layout and construction of the body. It is almost useless to give minute dimensions for body work. This also holds for minute dimensions of the frame or chassis. The all-steel body illustrated is approximately 19 inches in width at the central portion. The welded gasoline tank is fitted within the body and supported by the body frame. The method of framing up the body is shown in several of the pictures. The cowl and deck sections are designed to slide over the frame sections supporting them and are anchored to the car frame with 5/16 inch cap screws.

The general design of the steel frame of the body is shown. It will be noted here that 1-inch angle iron is formed for the "U" members, one of which receives the fire wall and supports the rear of the hood, the other receives the instrument panel and supports the steering gear. It will be noted that there are two braces between these two "U" members, one being a horizontal brace and the other one an angular brace, designed to take thrust and stiffen it. The body metal is designed in two sections (hood and deck) so that they may be repaired and easily assembled.

When building the body first lay out the 1/8"x 1¼"x1¼" angle iron sills and bend them to the form of the body plan. This is determined by dimensions of the sections A, B, C, D and F at their open ends, which are later welded to the sills. Next make up and erect curved sections A, B, C and D and the square section F. Next make up and run in sections E, H and also section G, which is made from ¼"x1" flat steel. All other sections are made from 1/8"x1"x1" angle iron. All angular braces and horizontal rails are made from 1/8"x1"x1" angle.

The cowl section and the deck section are joined at a point approximately even with the

(Continued on page 125)

INVENTORS

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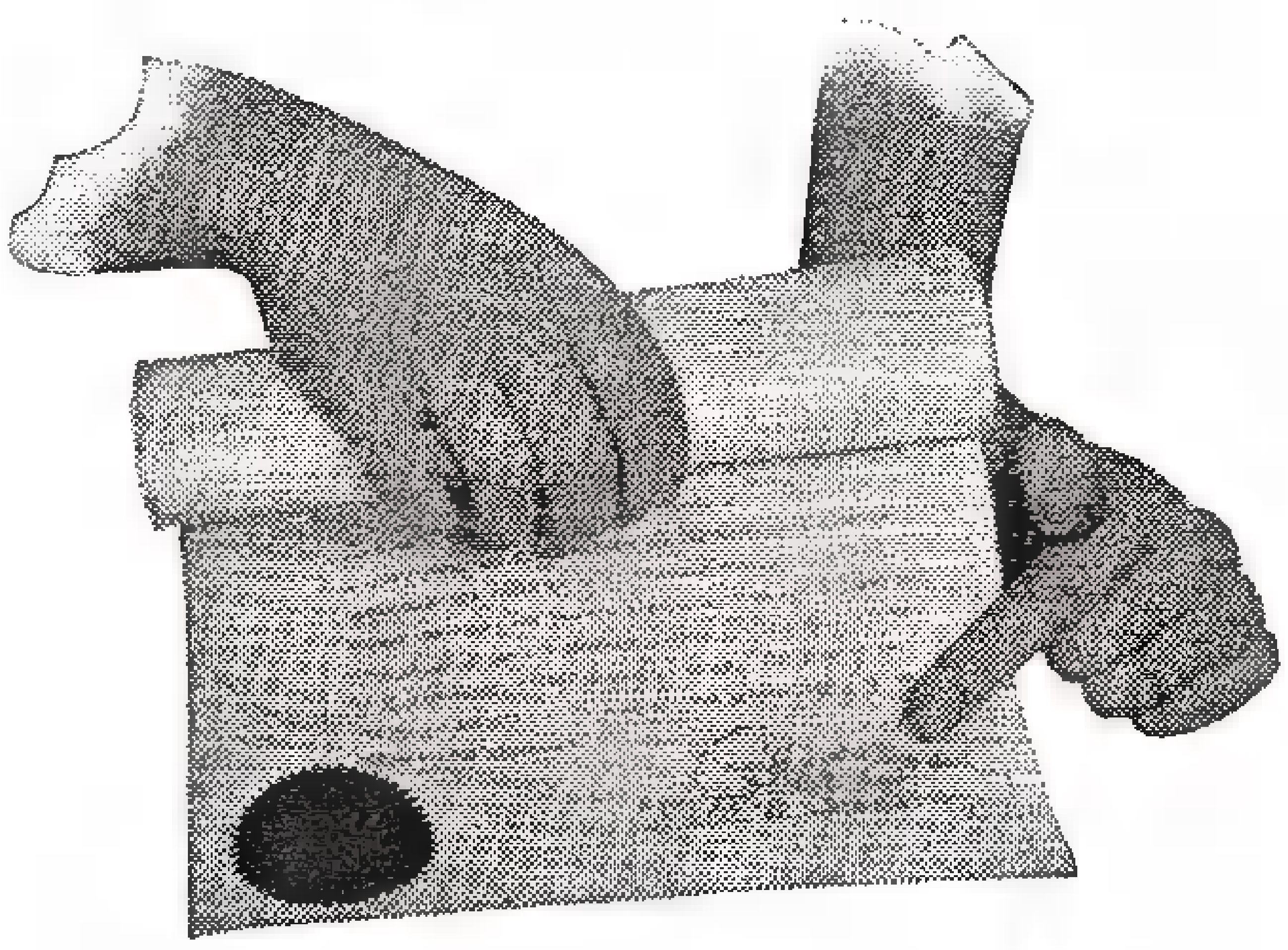

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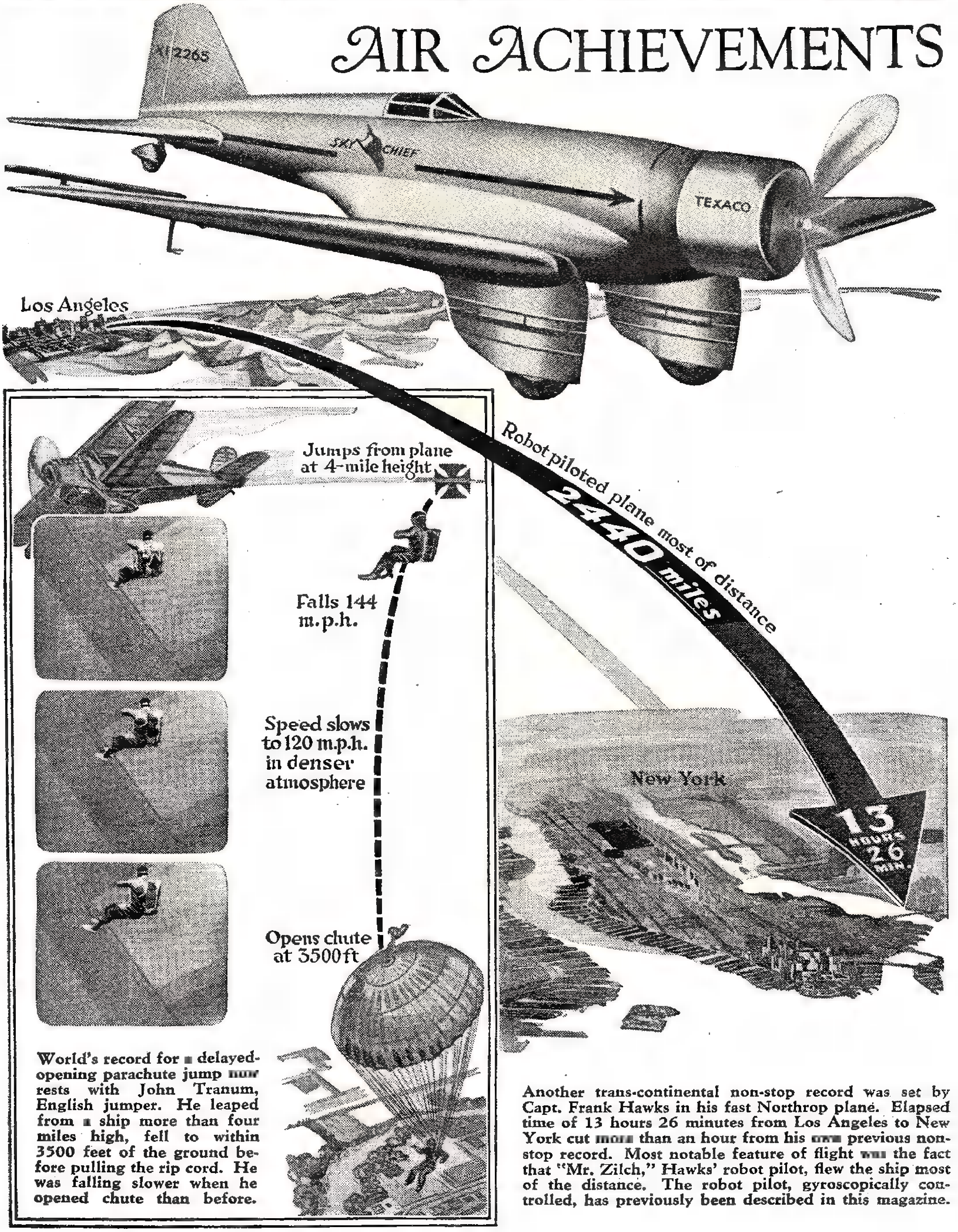
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World's record for a delayed-opening parachute jump now rests with John Tranum, English jumper. He leaped from a ship more than four miles high, fell to within 3500 feet of the ground before pulling the rip cord. He was falling slower when he opened chute than before.

Another trans-continental non-stop record was set by Capt. Frank Hawks in his fast Northrop plane. Elapsed time of 13 hours 26 minutes from Los Angeles to New York cut more than an hour from his own previous non-stop record. Most notable feature of flight was the fact that "Mr. Zilch," Hawks' robot pilot, flew the ship most of the distance. The robot pilot, gyroscopically controlled, has previously been described in this magazine.

AND INVENTIONS

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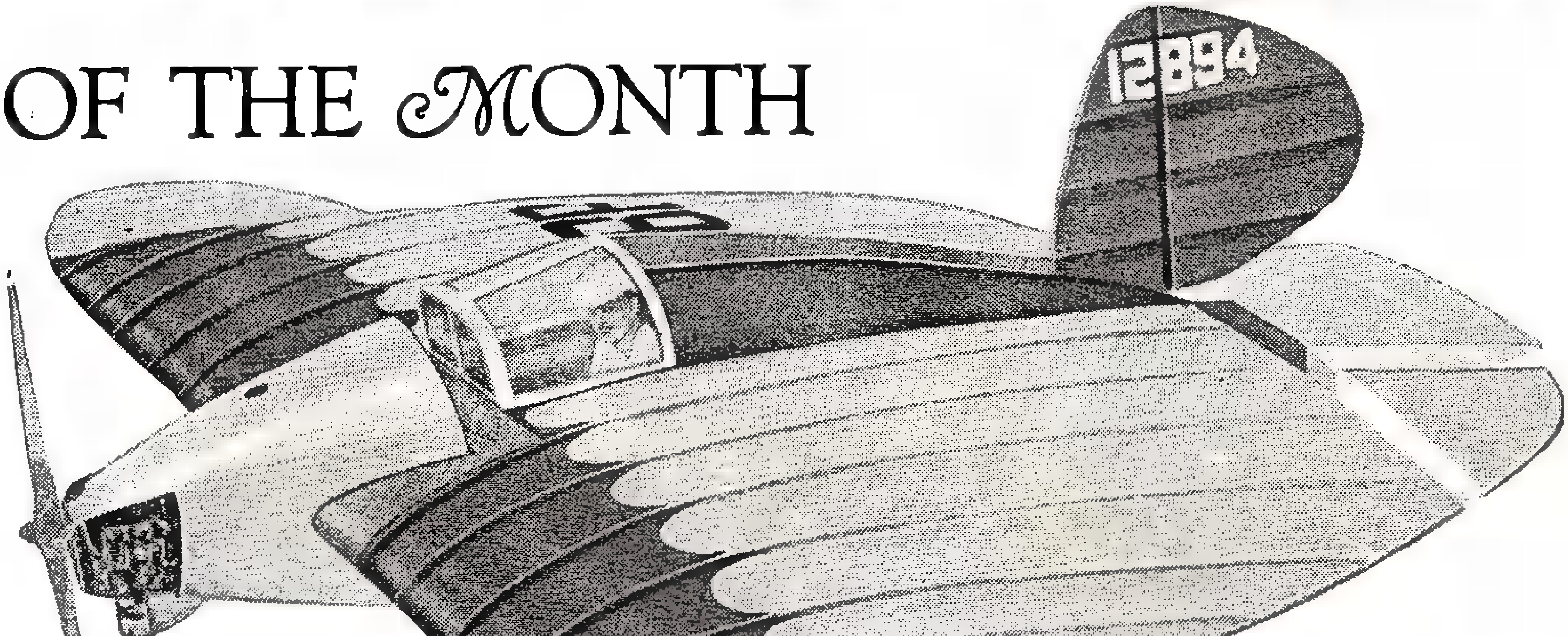
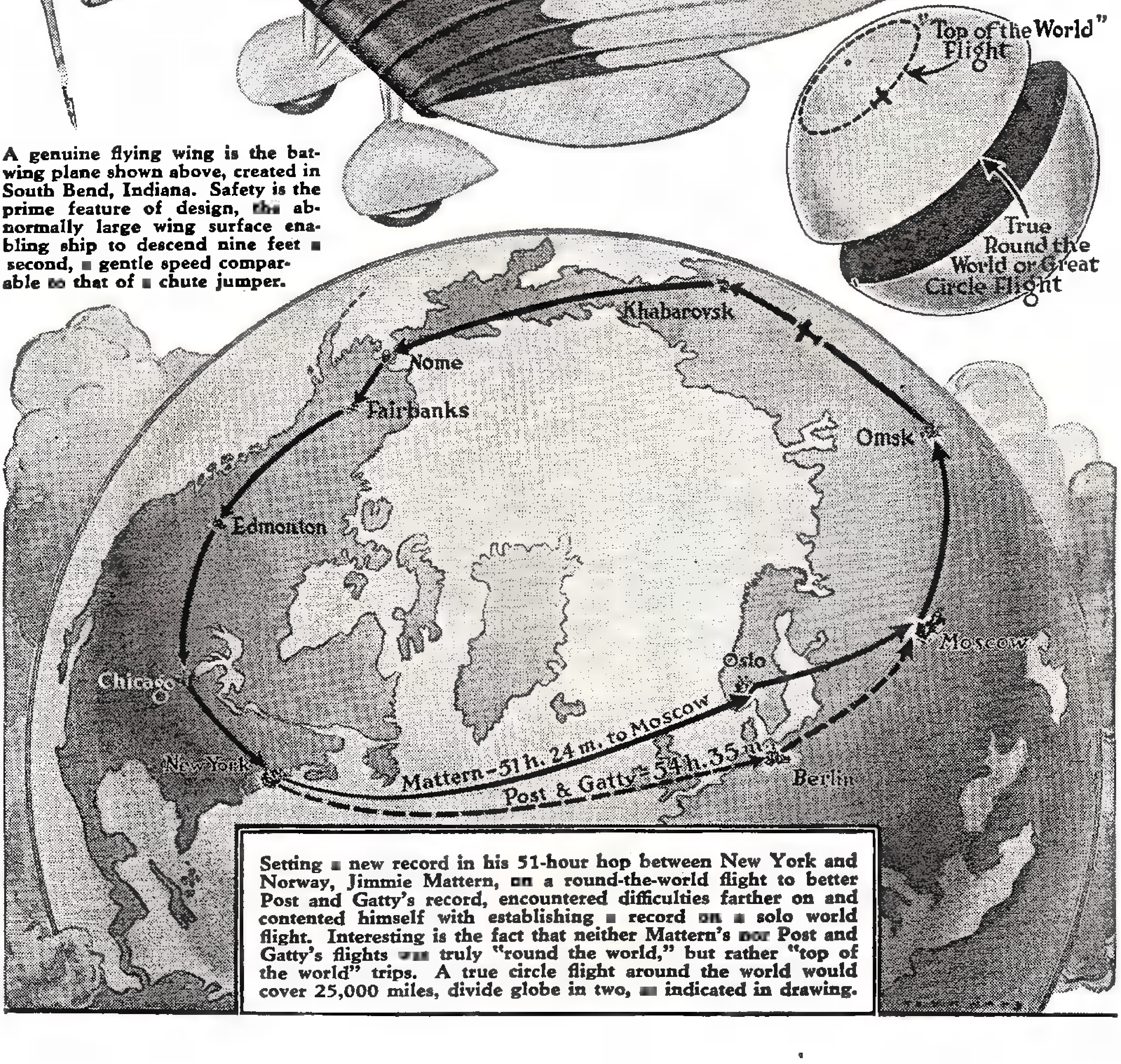


A genuine flying wing is the bat-wing plane shown above, created in South Bend, Indiana. Safety is the prime feature of design, the abnormally large wing surface enabling ship to descend nine feet a second, a gentle speed comparable to that of a chute jumper.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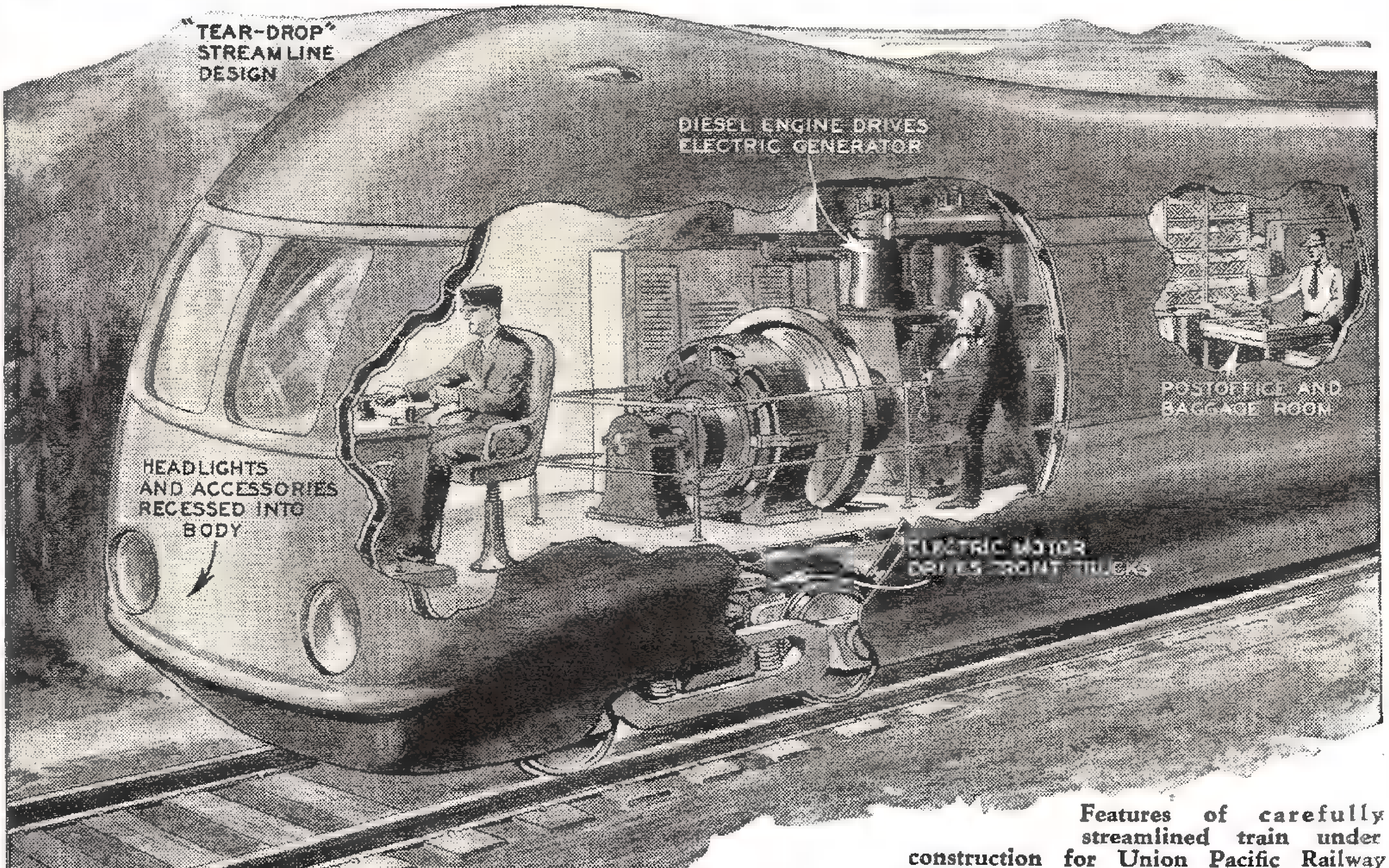
Setting a new record in his 51-hour hop between New York and Norway, Jimmie Mattern, on a round-the-world flight to better Post and Gatty's record, encountered difficulties farther on and contented himself with establishing a record on a solo world flight. Interesting is the fact that neither Mattern's nor Post and Gatty's flights was truly "round the world," but rather "top of the world" trips. A true circle flight around the world would cover 25,000 miles, divide globe in two, as indicated in drawing.

Streamline TRAIN Heralds


"TEAR-DROP" STREAM LINE DESIGN
DIESEL ENGINE DRIVES ELECTRIC GENERATOR
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HEADLIGHTS AND ACCESSORIES RECESSED INTO BODY
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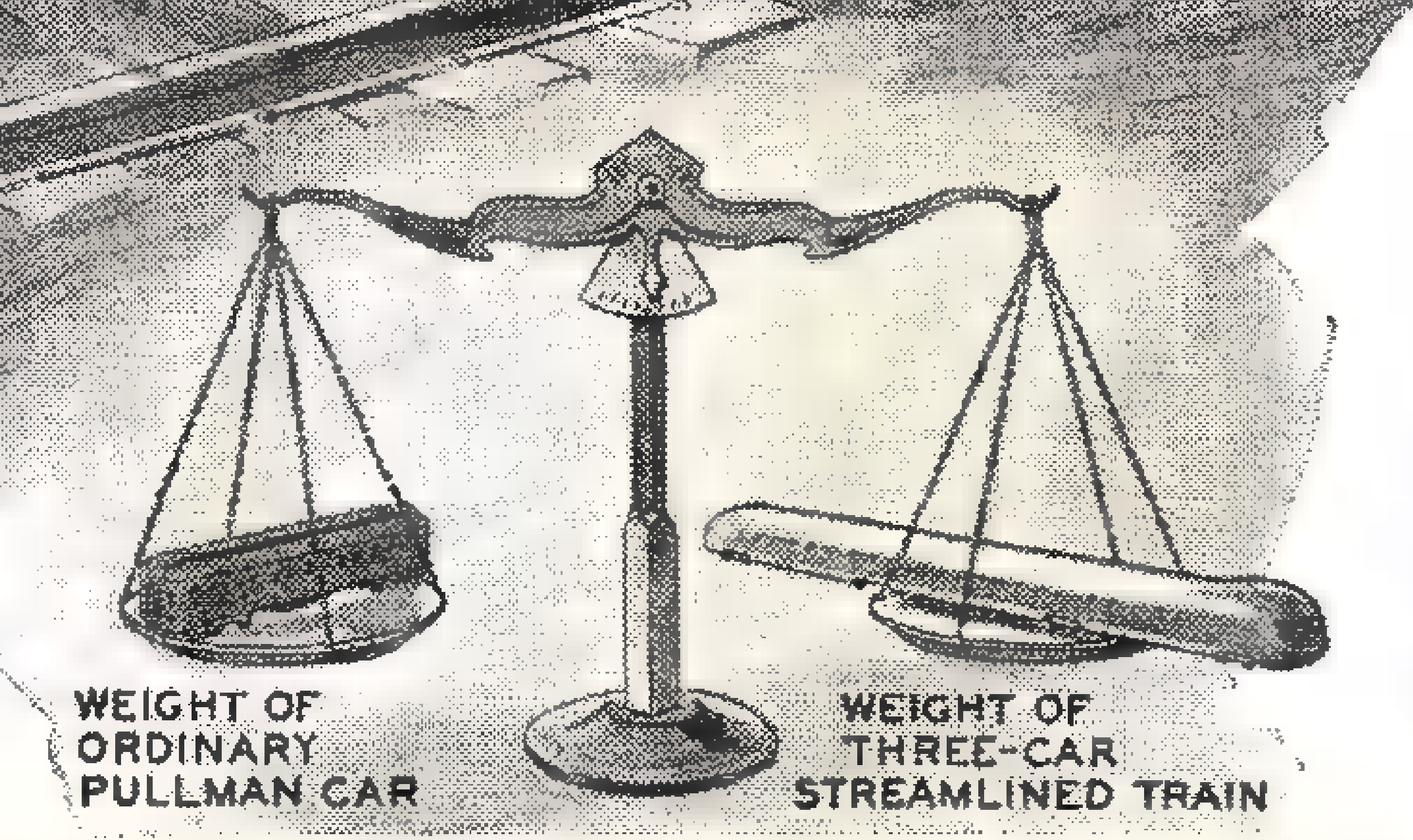
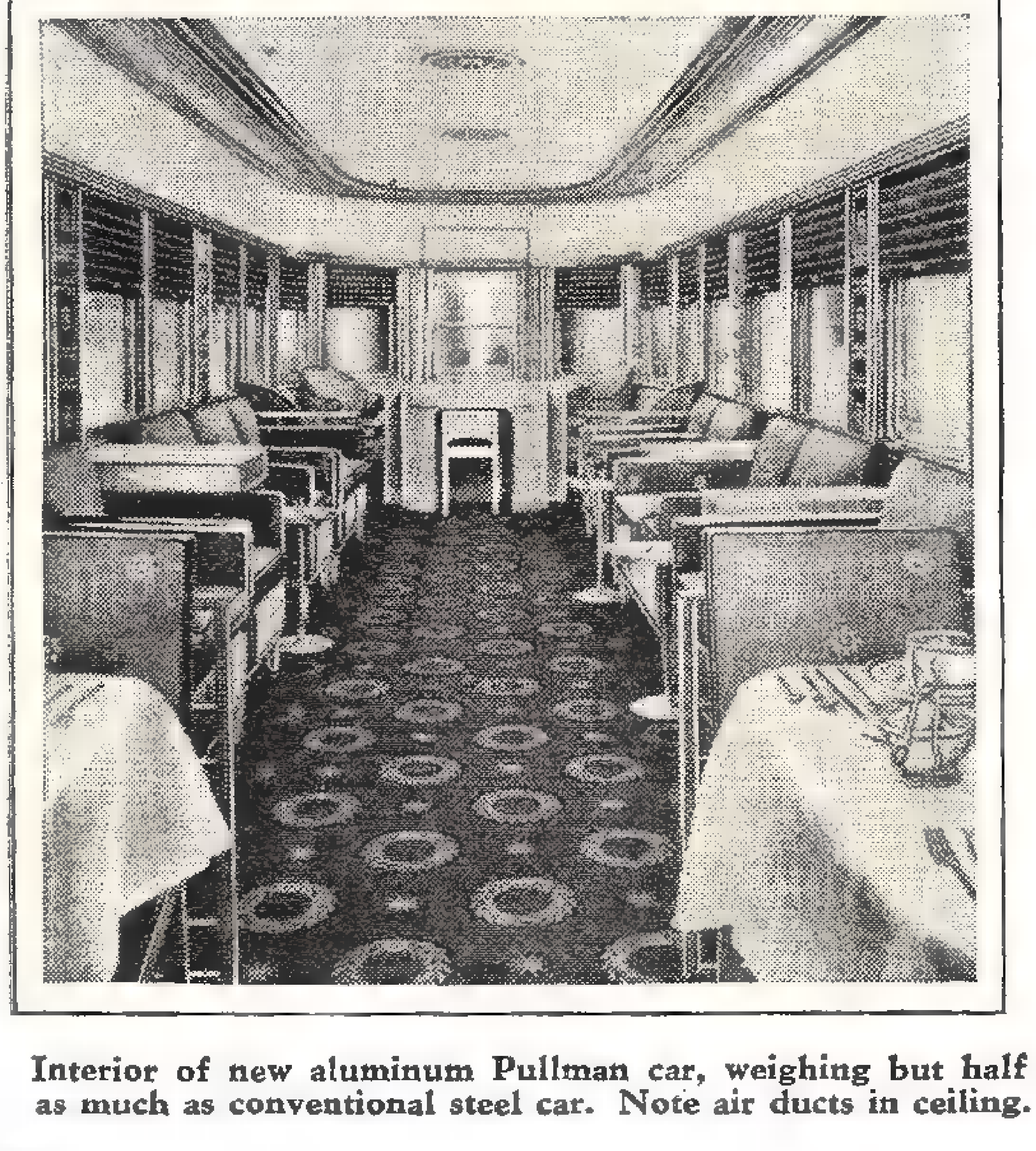

WEIGHT OF ORDINARY PULLMAN CAR
WEIGHT OF THREE-CAR STREAMLINED TRAIN

Features of carefully streamlined train under construction for Union Pacific Railway [redacted] given in drawing. Note clean, cinderless power mechanism—Diesel engine hooked to generator and motor on front trucks. At left, three-car streamlined train weighs [redacted] more than ordinary Pullman.



Interior of new aluminum Pullman car, weighing but half as much as conventional steel car. Note air ducts in ceiling.

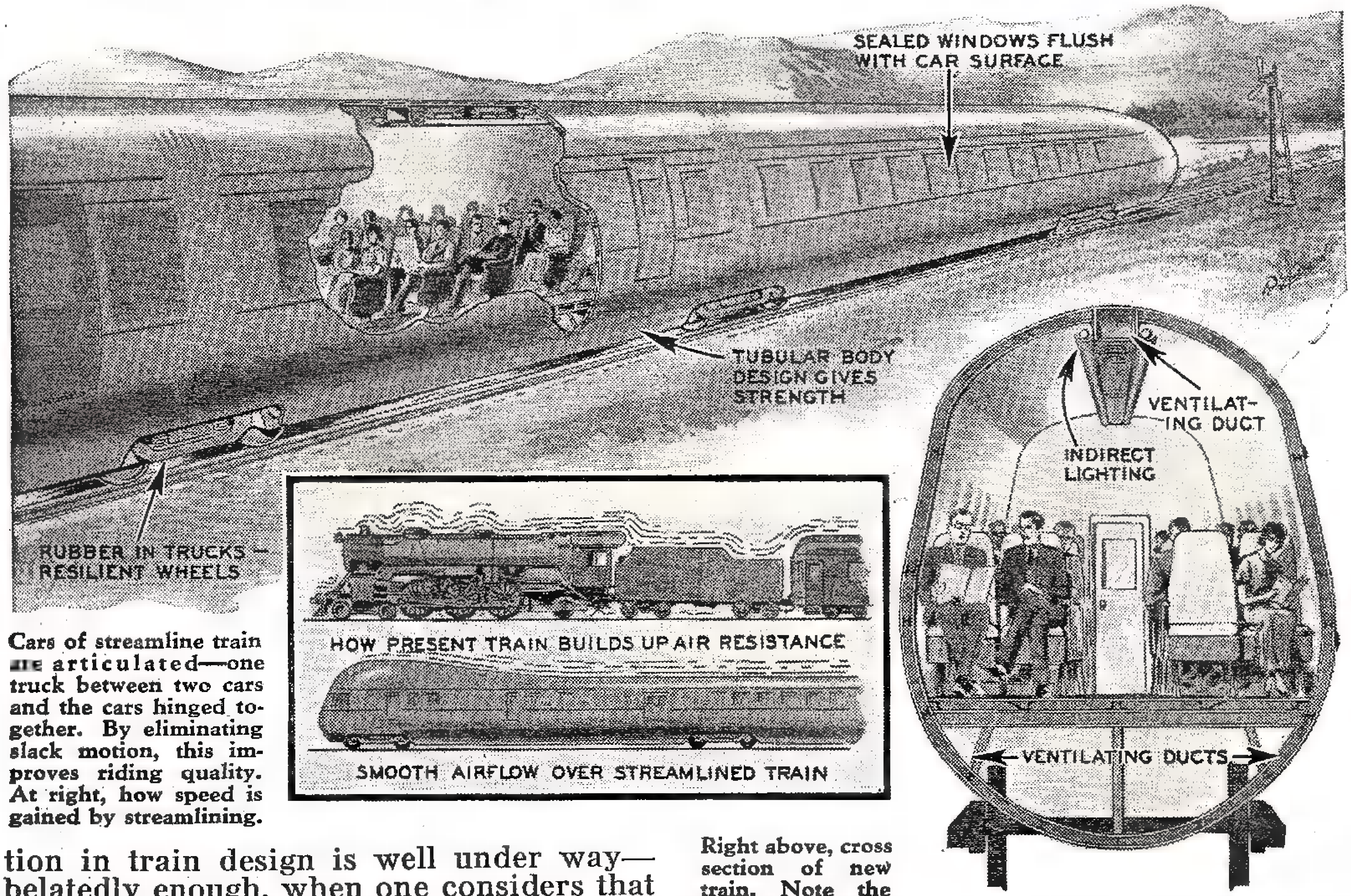
by ROY DEAN

Super-speed railway trains are here—rivaling airplanes in swiftness, gliding along in luxurious silence, resembling trains no more than the Leviathan looks like the flagship of Columbus. An amazing new era in railroad transportation is forcing present-style trains toward the junkpile. The "why" of this astonishing revolution in travel style is given in this absorbing article.

A FEW months ago MODERN MECHANIX AND INVENTIONS published an article calling attention to the need for an entirely new type of railroad train which would give passengers cool, clean, quiet transportation free from the annoyances of cinders, blasts of desert air from outside, the jerking and swaying of cars in motion, and the endless click of wheels against rail joints.

Now such a train is in actual process of construction for the Union Pacific Railway, and transportation experts are unanimous in the opinion that its design opens up a new era in rail travel which will eventually force the heavy steel trains of today, with their fuming coal-burning locomotives, onto the scrap heap. A real revolu-

New Era for RAILROADS


SEALED WINDOWS FLUSH WITH CAR SURFACE
TUBULAR BODY DESIGN GIVES STRENGTH
RUBBER IN TRUCKS — RESILIENT WHEELS
HOW PRESENT TRAIN BUILDS UP AIR RESISTANCE
SMOOTH AIRFLOW OVER STREAMLINED TRAIN
VENTILATING DUCT
INDIRECT LIGHTING
VENTILATING DUCTS

Cars of streamline train are articulated—one truck between two cars and the cars hinged together. By eliminating slack motion, this improves riding quality. At right, how speed is gained by streamlining.

Right above, cross section of new train. Note the three ducts for forced ventilation of washed air. All cars are completely sealed against outside air. Note the tubular construction of body which gives great strength.

tion in train design is well under way—belatedly enough, when one considers that except for size our present locomotives are not essentially different from those used a hundred years ago, and there have been few new principles in passenger car structure since someone thought of putting a roof over a floor on wheels.

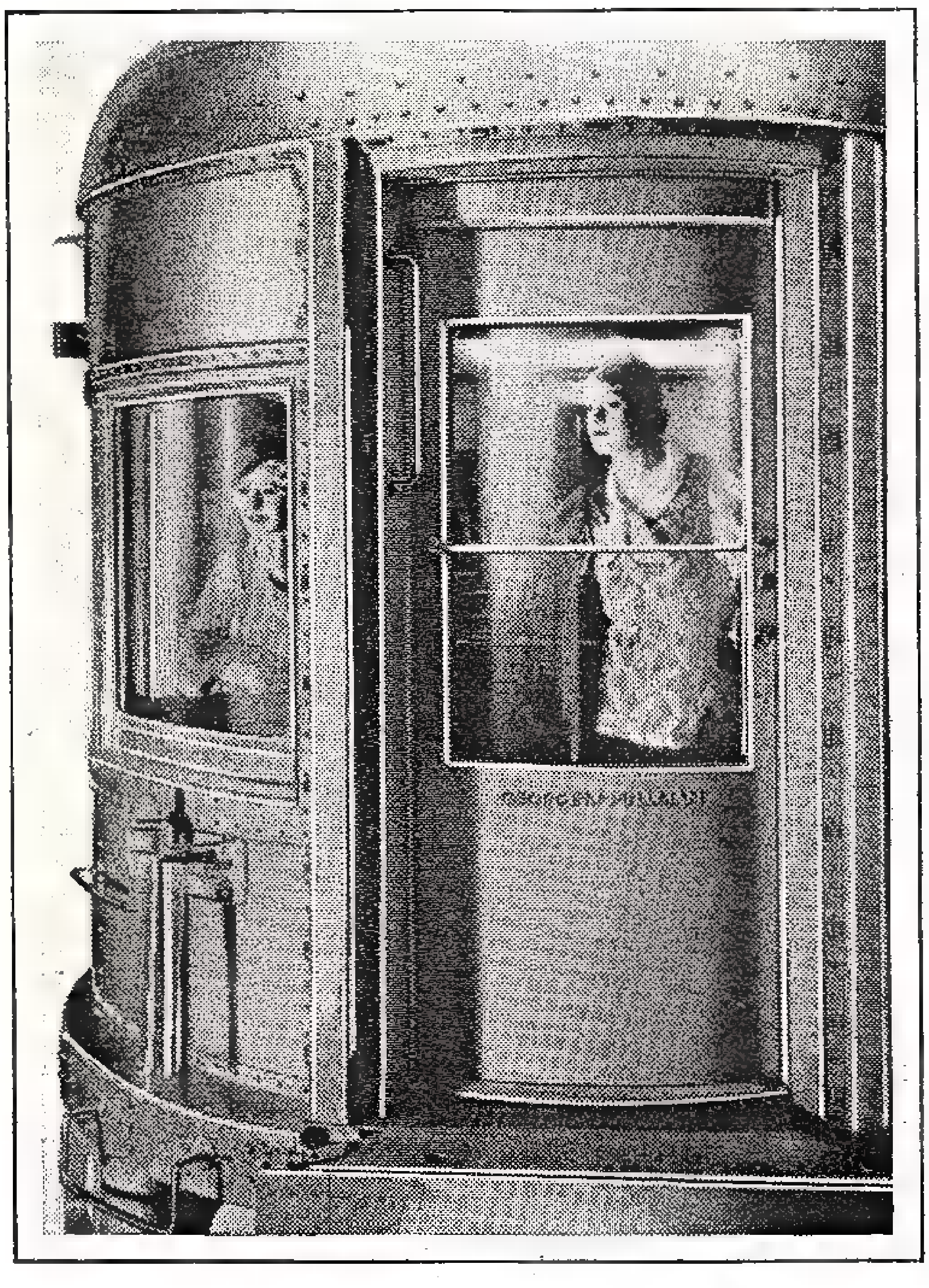
Competition of automobile, bus, truck and airplane has finally forced the railroads out of their inertia, made them realize that plenty of passenger business is theirs to command if they furnish the public what it demands in the way of economy and comfort.

Power Needs Reduced by Half

That the Union Pacific train fills this bill to a T, there can be no doubt after a study of the design reproduced above. It is fully streamlined, and this, in conjunction with its light weight (the three-car train weighs no more than an ordinary Pullman) makes possible speeds of 110 miles an hour.

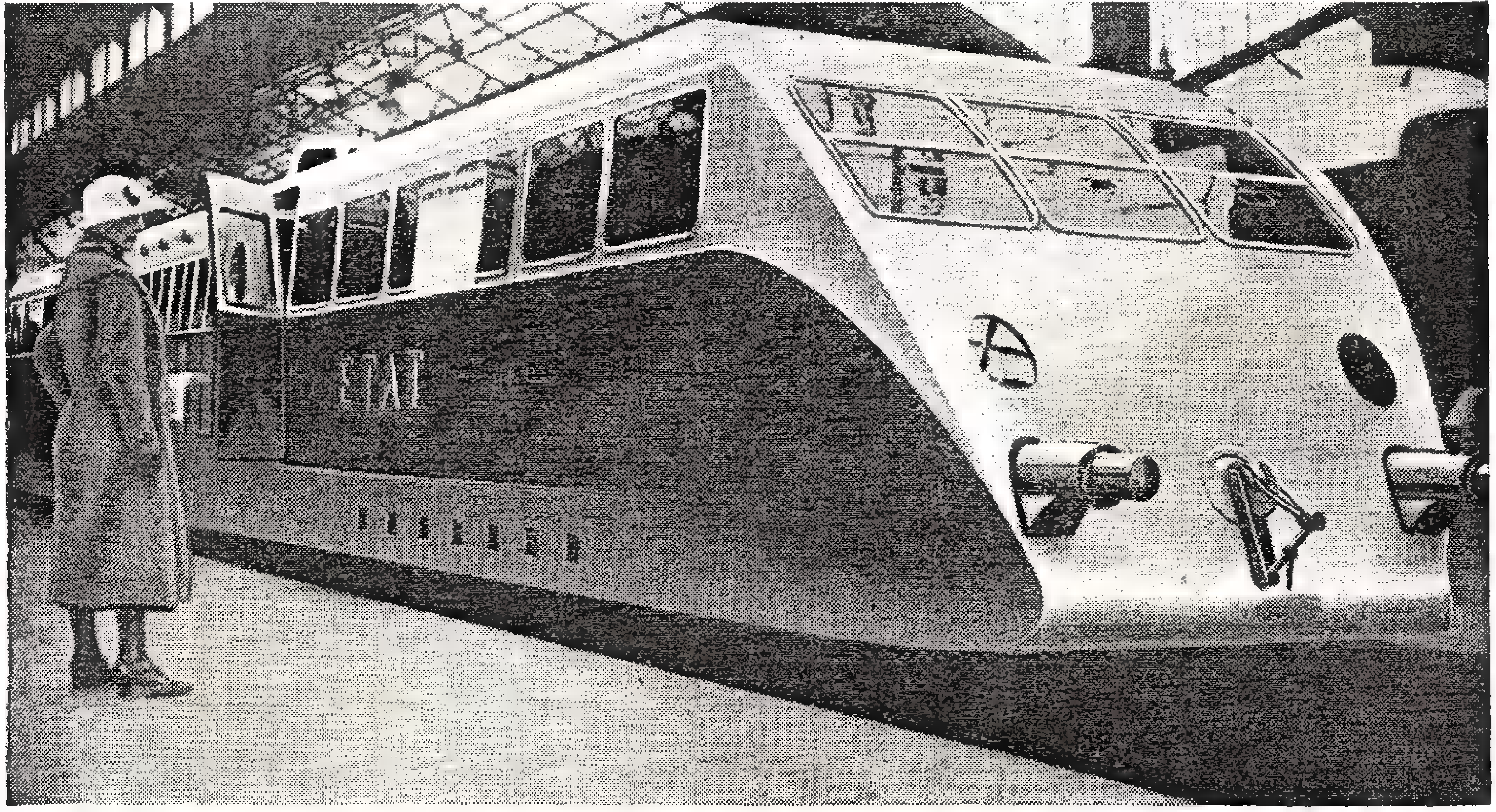
To the airplane is due the development of aluminum alloys which reduce weight two-thirds. Each car of the new train is tubular in shape, giving great strength. Streamlining of the train is carried farther than ever before, so efficiently that it is estimated power requirements at 100 miles an hour will be only half that required for conventional trains.

Windows are placed flush with the walls, vestibules between cars completely covered over, and headlights and other projecting units are recessed into the body. Outside air never enters the train. Three ducts keep

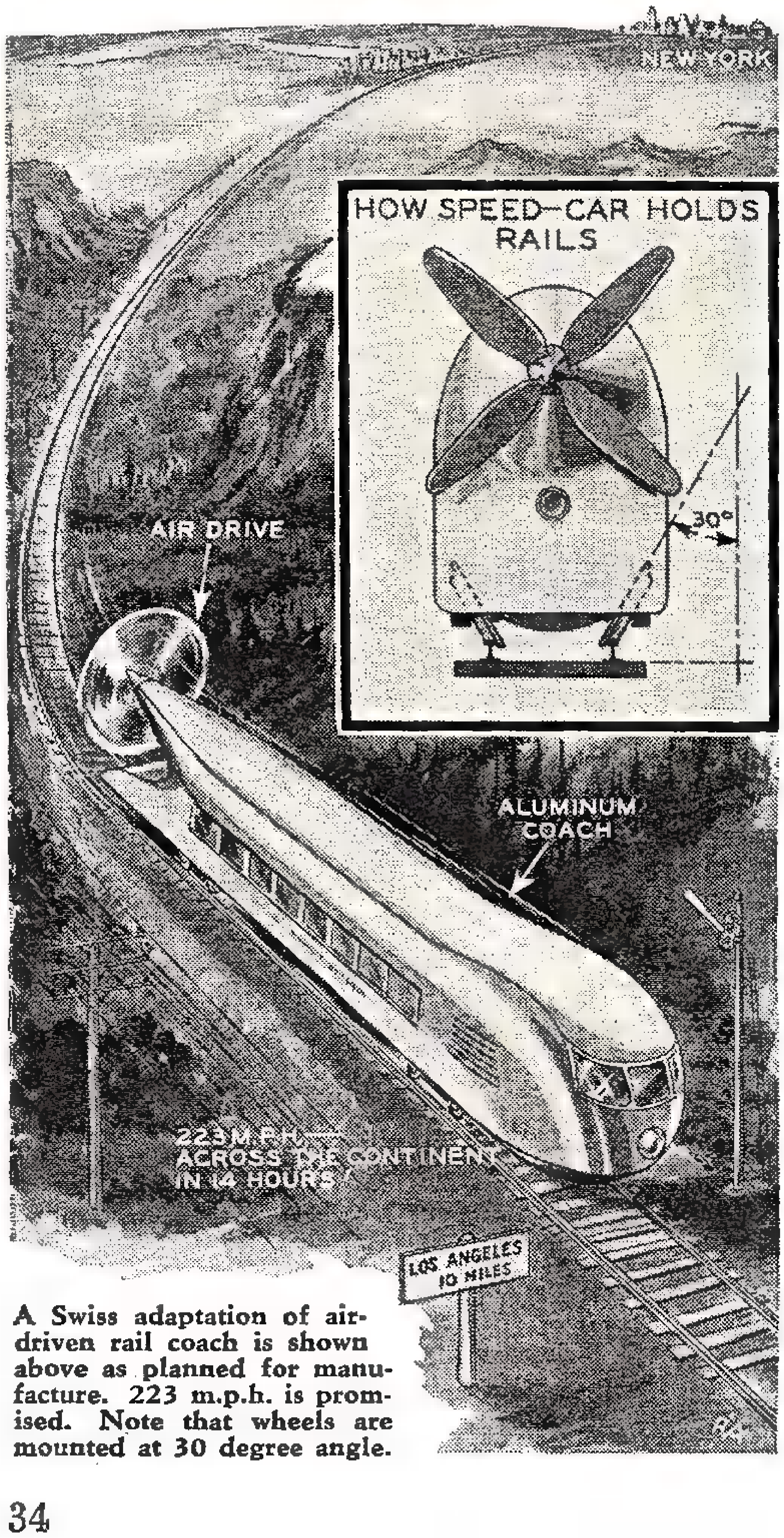


Rounded end of new Pullman car, interior of which is shown on opposite page. Steel, too heavy, is out of the picture in new railcars; light metal alloys take its place.

Europe Has Long Had Motor-Driven Trains Developing 100 M. P. H.



European nations have up to now set the pace in motor-driven trains. This "automotrice", whose 115 m.p.h. are said to make it the fastest rail motor in the world, seats 52 persons. It is shown in the Gare St. Lazare, Paris, France.


NEW YORK
HOW SPEED—CAR HOLDS RAILS
30°
AIR DRIVE
ALUMINUM COACH
223 M.P.H.— ACROSS THE CONTINENT IN 14 HOURS!
LOS ANGELES 10 MILES

A Swiss adaptation of air-driven rail coach is shown above as planned for manufacture. 223 m.p.h. is promised. Note that wheels are mounted at 30 degree angle.

it perfectly ventilated; in summer the air is filtered and cooled, in winter, heated.

Silence comes from use of heavy body insulation, use of rubber in trucks, and a resilient wheel to absorb the impact of rail joints. Trucks are swung between each two cars, the front end of one car resting on the same truck which carries the rear end of the preceding car.

Power comes from a Diesel engine with direct connected electric generator and motors on the wheels of the forward truck. Thus smoke, cinders, and soot of the steam locomotive are entirely done away with.

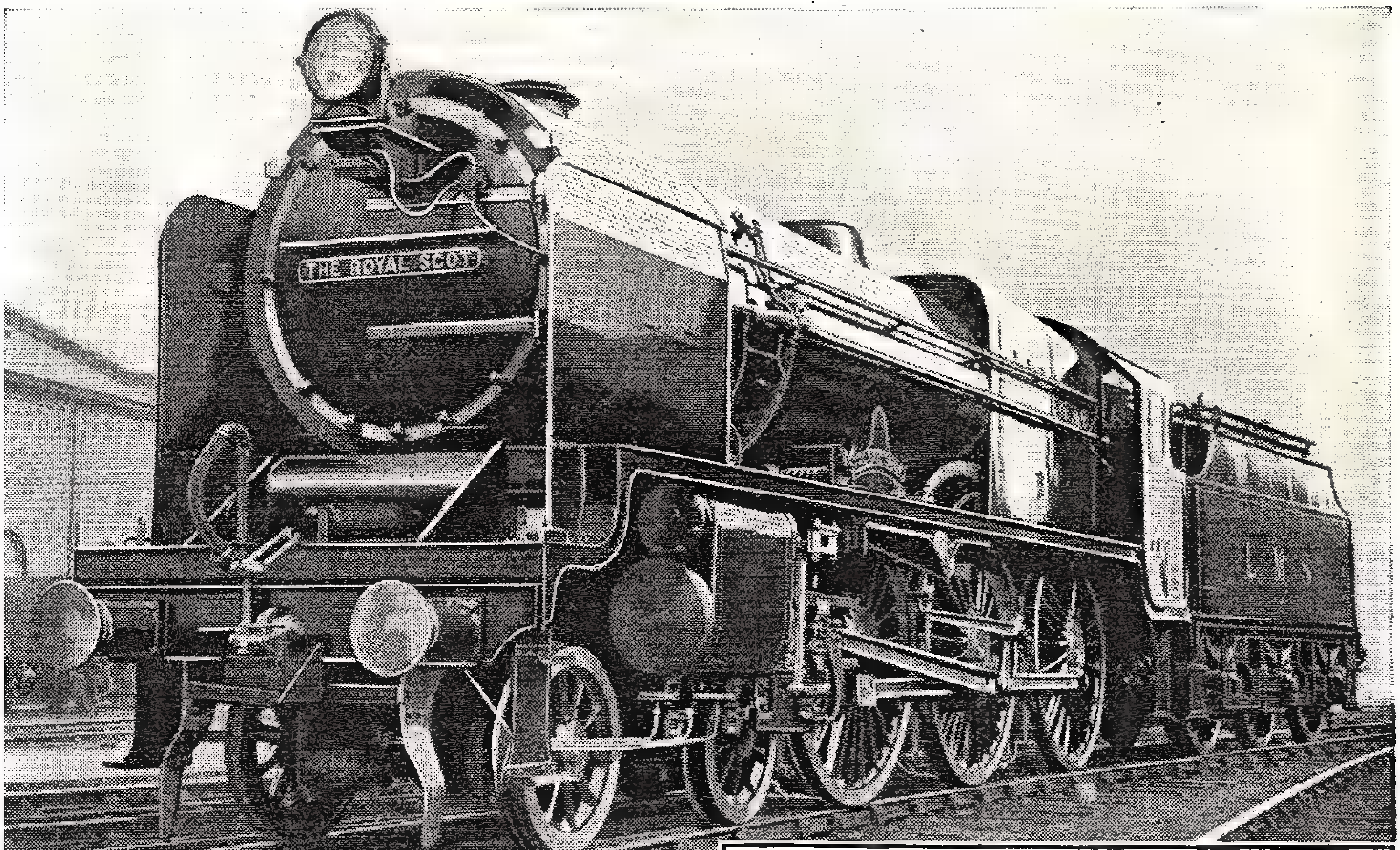
So much for the Union Pacific train. It is now under construction and will be used to test its feasibility for transcontinental travel. It should be pointed out, however, that though this is by far the most advanced design of its type, European nations for some time have "had the jump" on us in developing motor driven trains.

Foreign Super-Speed Cars

A government-owned French railway has successfully tested a double-decked rail car at 125 miles an hour, with an 800 horsepower engine using benzol or alcohol. The Bugatti "automotrice," illustrated elsewhere in this article, has long been popular. In Germany, a Zeppelin car, streamlined and driven by an air propeller, has been in use for three years.

An air-driven car has been designed by a Swiss inventor which he claims is capable of 223 miles an hour. Although his car has not been constructed yet, because of financial difficulties, a study of his idea as reproduced with this article indicates that

Most Railway Speed Records (Regular Schedules) Are Held by Europe

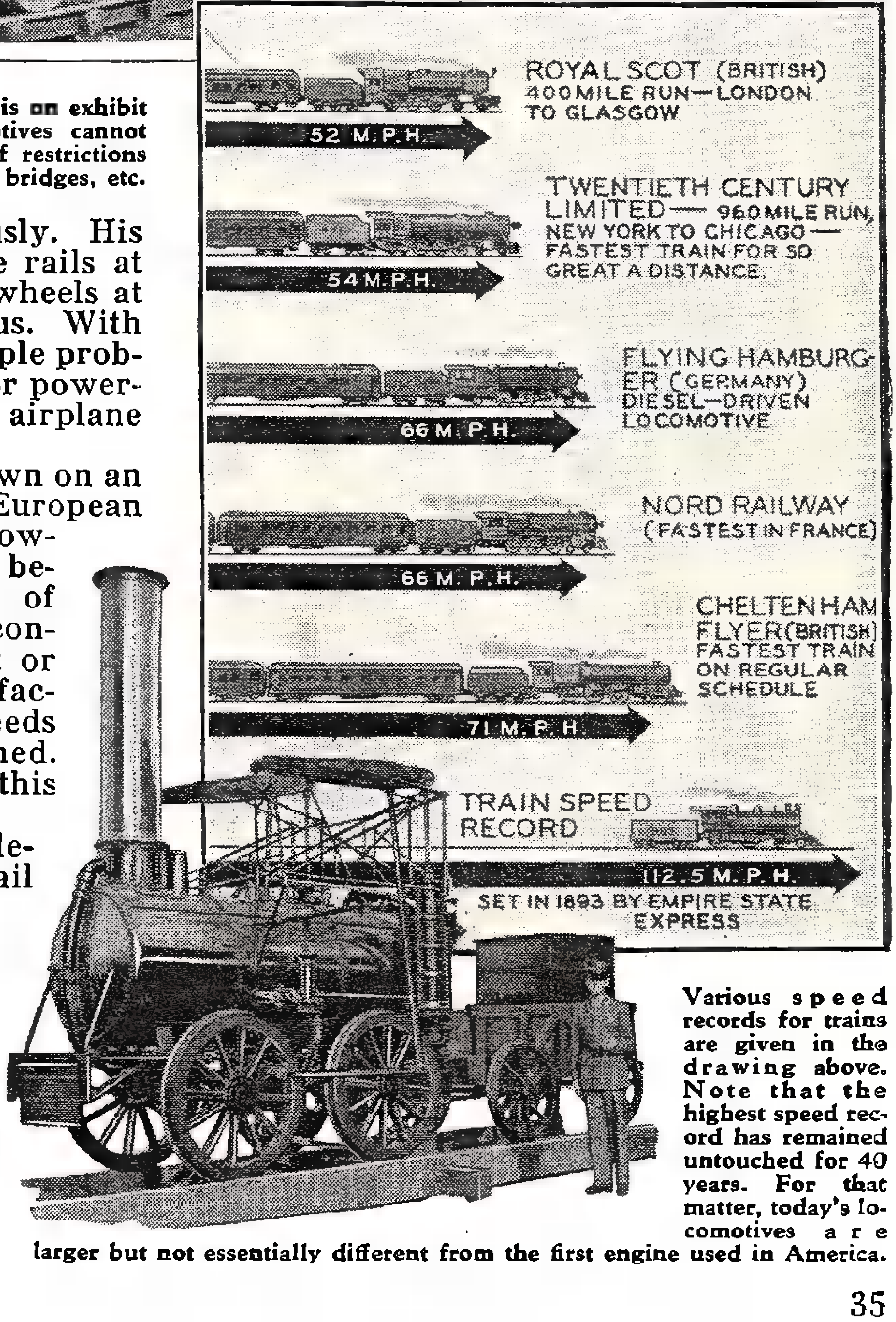


The Royal Scot, England's most famous train, is on exhibit at the Century of Progress. British locomotives cannot approach American engines in size because of restrictions as to clearance and size made necessary by low bridges, etc.

it is entitled to be taken seriously. His method of holding the car to the rails at extreme speeds by mounting the wheels at a thirty degree angle is ingenious. With this difficulty overcome, it is a simple problem in mechanics to install a motor powerful enough to drive the train at airplane speed.

Most train speed records, as shown on an accompanying chart, rest in European hands. It must be remembered, however, that trains are rigidly kept below certain speeds for reasons of operation. Wear and tear, fuel consumption, possibility of accident or derailment, and dozens of other factors hold down American train speeds below what could easily be attained. Weight of cars is much greater in this country than in Europe.

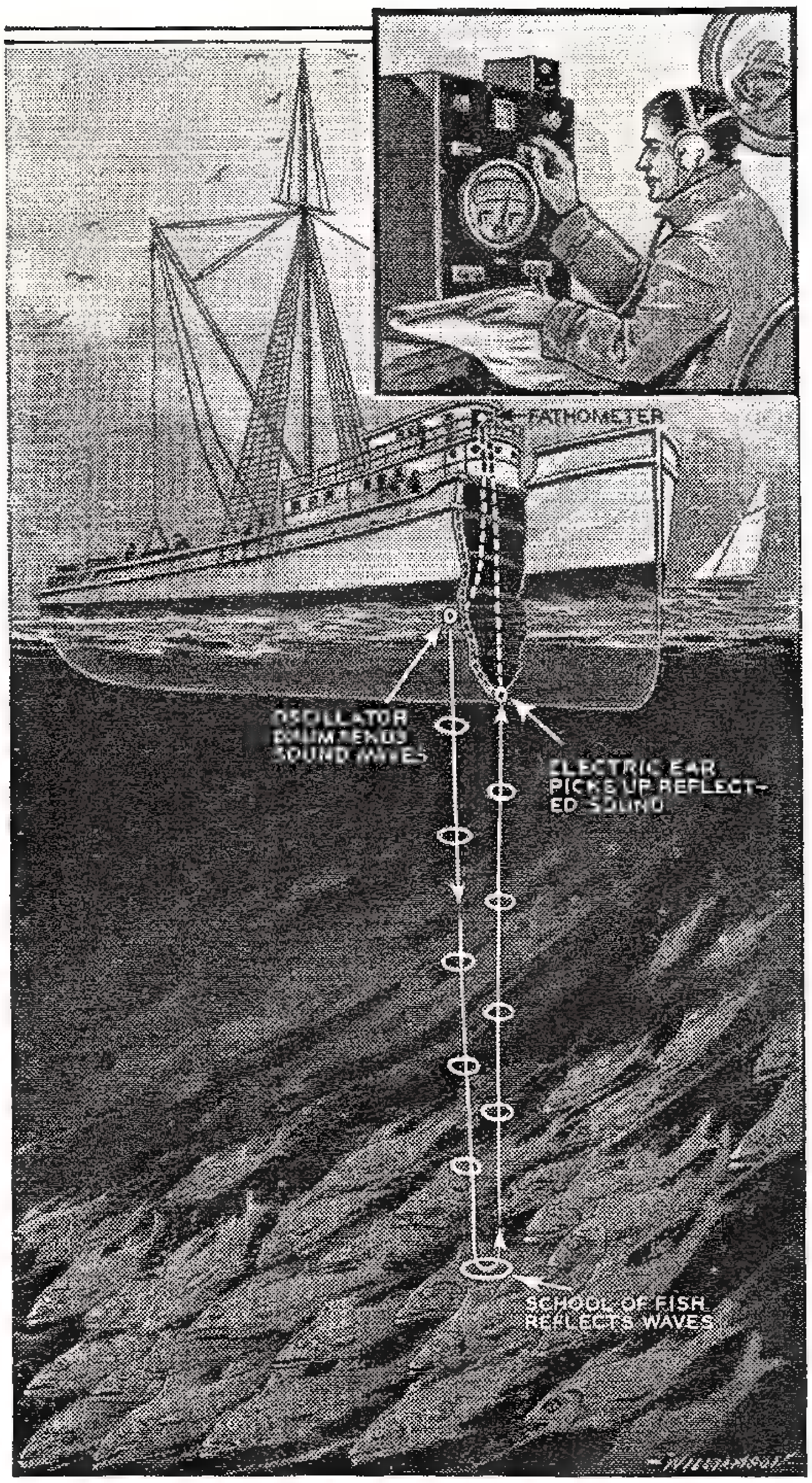
Nevertheless, an interesting sidelight on the rate of advance of rail design is afforded by the fact that the speed record of 112.5 miles an hour still stands—and this was set 40 years ago when famous old Engine 999 hauled the Empire State Express at this rate. The 112.5 miles an hour speed is just about what a well streamlined train should do hour after hour if Mr. Train Rider is to be satisfied that the railway is keeping up to date.



Various speed records for trains are given in the drawing above. Note that the highest speed record has remained untouched for 40 years. For that matter, today's locomotives are larger but not essentially different from the first engine used in America.

Echo Sounding Device Used to Locate Schools of Fish

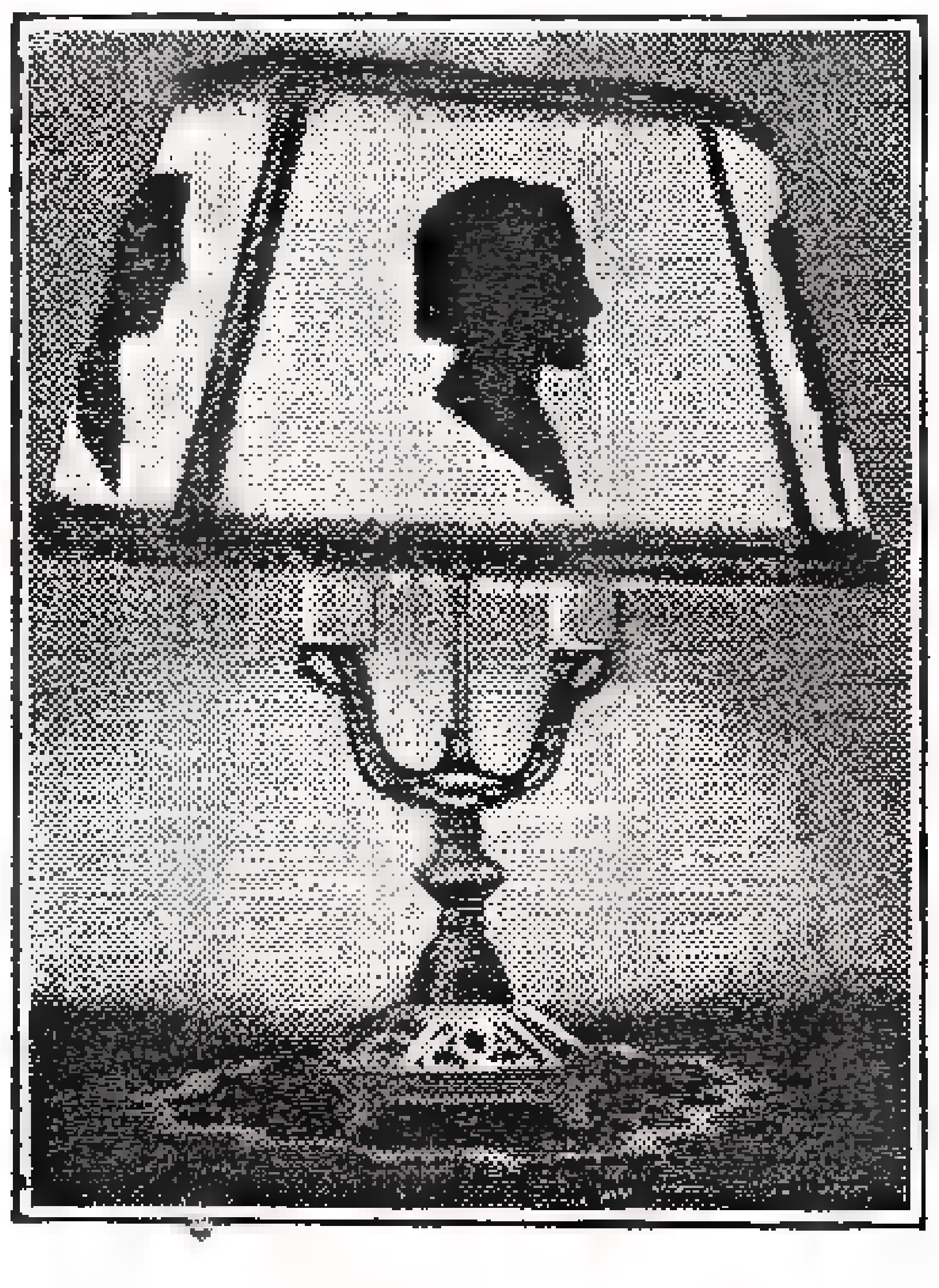
LOCATION of schools of fish by shooting sound waves down at them and listening to the echoes, is a development forecast by a British radio engineer. The proposed fish detector is described as a modification of the echo sounding device now widely used on ships to determine the depth of the sea bottom. Echoes of distinctive character are returned by different types of sea bottoms, and it is expected data can be worked up that will permit fishing fleets to tell just where the sea underneath them is populous enough to make it profitable enough to let down nets.


FATHOMETER
OSCILLATOR DRUM SENDS SOUND WAVES
ELECTRIC EAR PICKS UP REFLECTED SOUND
SCHOOL OF FISH REFLECTS WAVES

The echo-sounding device, adapted to fishing fleet purposes, locates schools by projecting sound waves downward then listening for echo. Fish schools have characteristic echo.

Silhouettes Decorate Lamp Shade

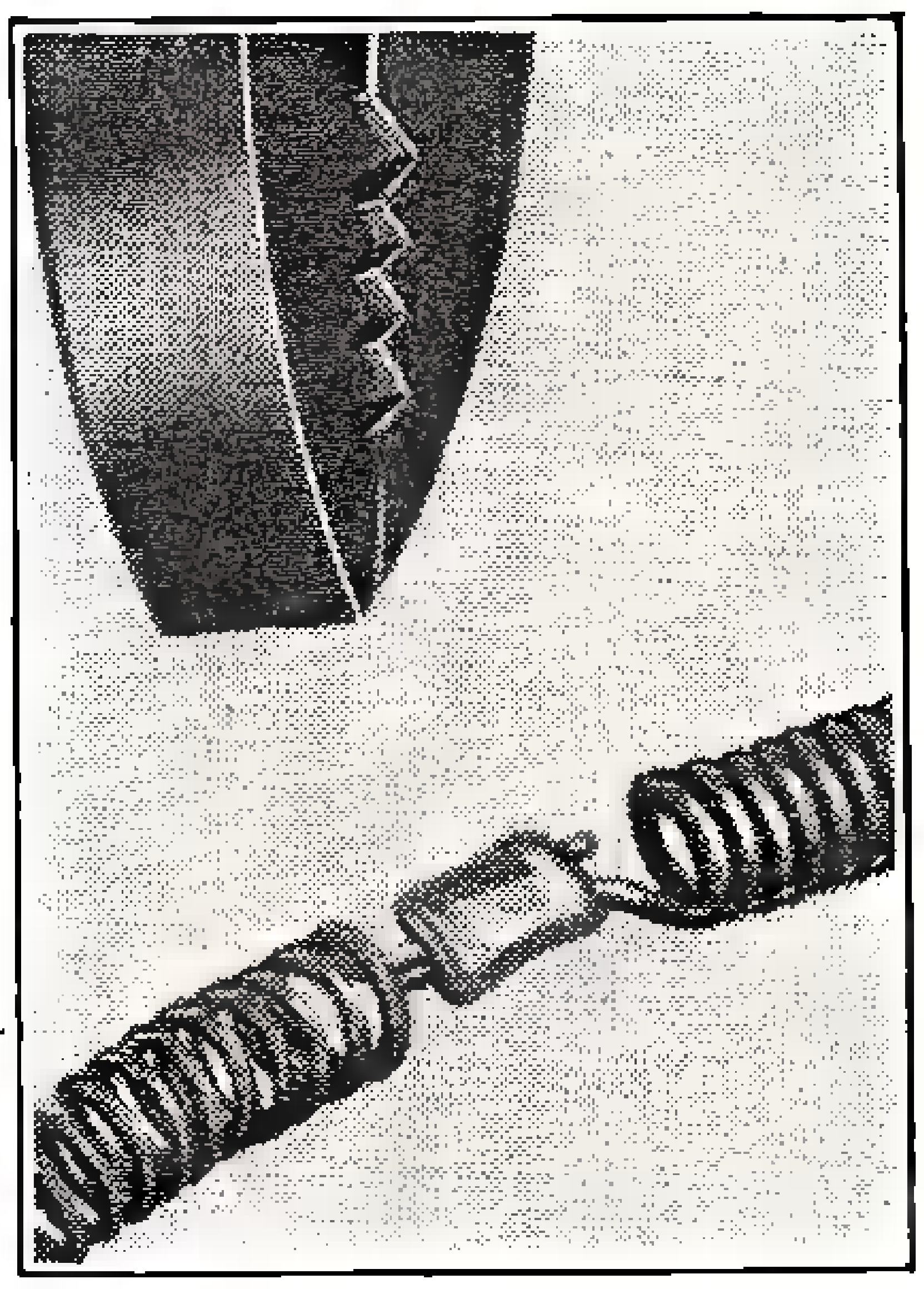
BY USING the lampshade as a frame, the family silhouettes may be grouped in a unique manner. An octagon-shaped lampshade, some black silhouette paper and glue are materials required. Sketch the profiles of the persons whose silhouettes you desire, then cut out the drawings. Glue or paste each picture in a separate panel of the shade, as illustrated at the left. Give the inside of the shade a coat of clear shellac to keep the silhouettes from curling.



Silhouettes are pasted on sides of the lamp shade with glue.

Sleeve Repairs Heating Coils

A SIMPLE little sleeve now on the market makes repair of broken electric iron and heater elements an easy job. The two ends of the broken element are inserted in the sleeve, which is then pinched with a pair of pliers. This makes a firm joint and saves expense of new element.



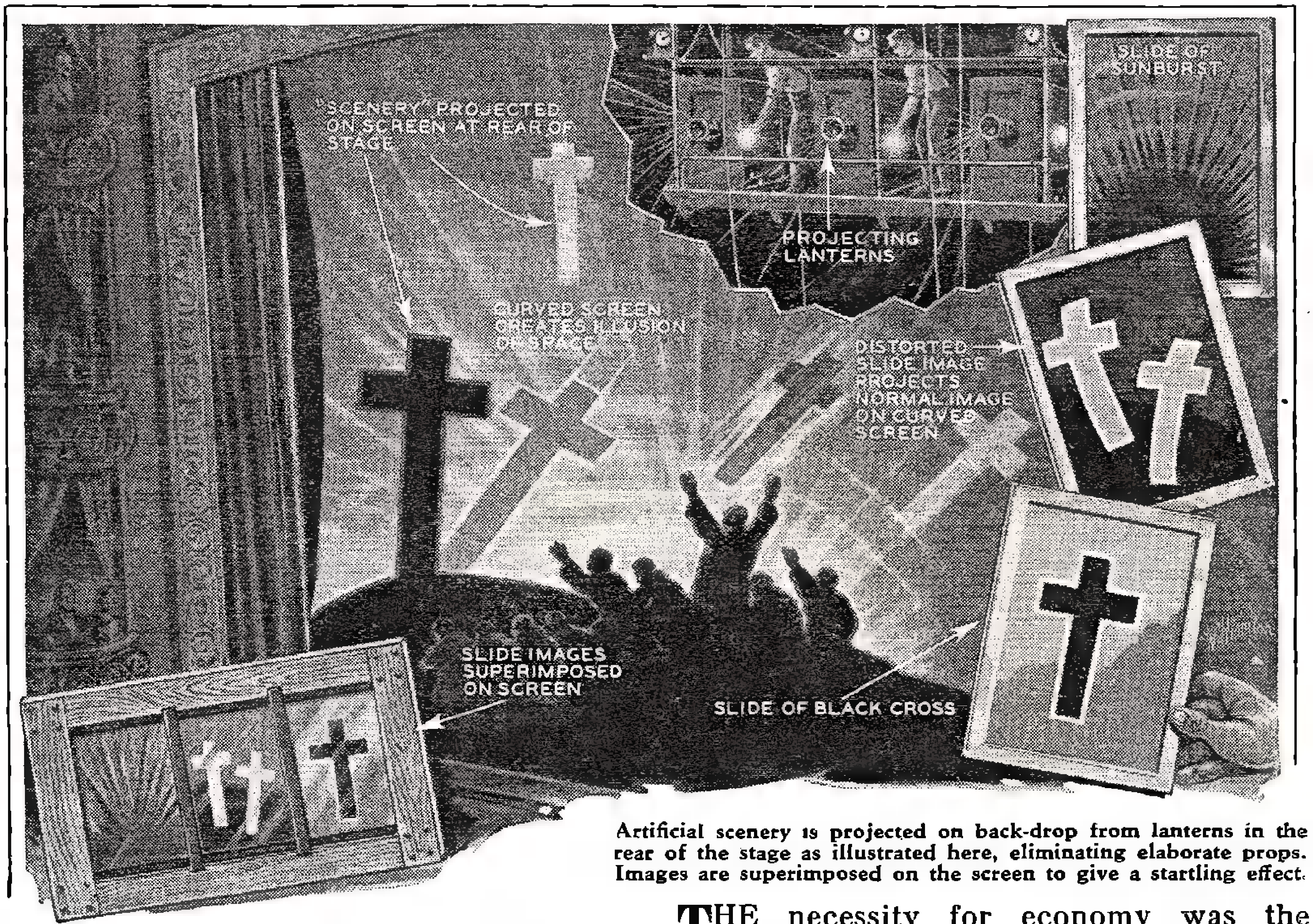
Pinching sleeve joins wire ends.

Making Odd Masks Is New Hobby

MAKING masks of celebrities from unique materials is a new hobby for the artistically inclined. Below are shown two of the masks, one of George Bernard Shaw, the famous Irish author, and the other of Greta Garbo, movie star. Mr. Shaw's face is made from tin, his whiskers from brushes. Garbo's hair is made from steel wool.

Old brushes form the whiskers on tin face of Bernard Shaw mask. Garbo mask has gilded steel wool for hair.

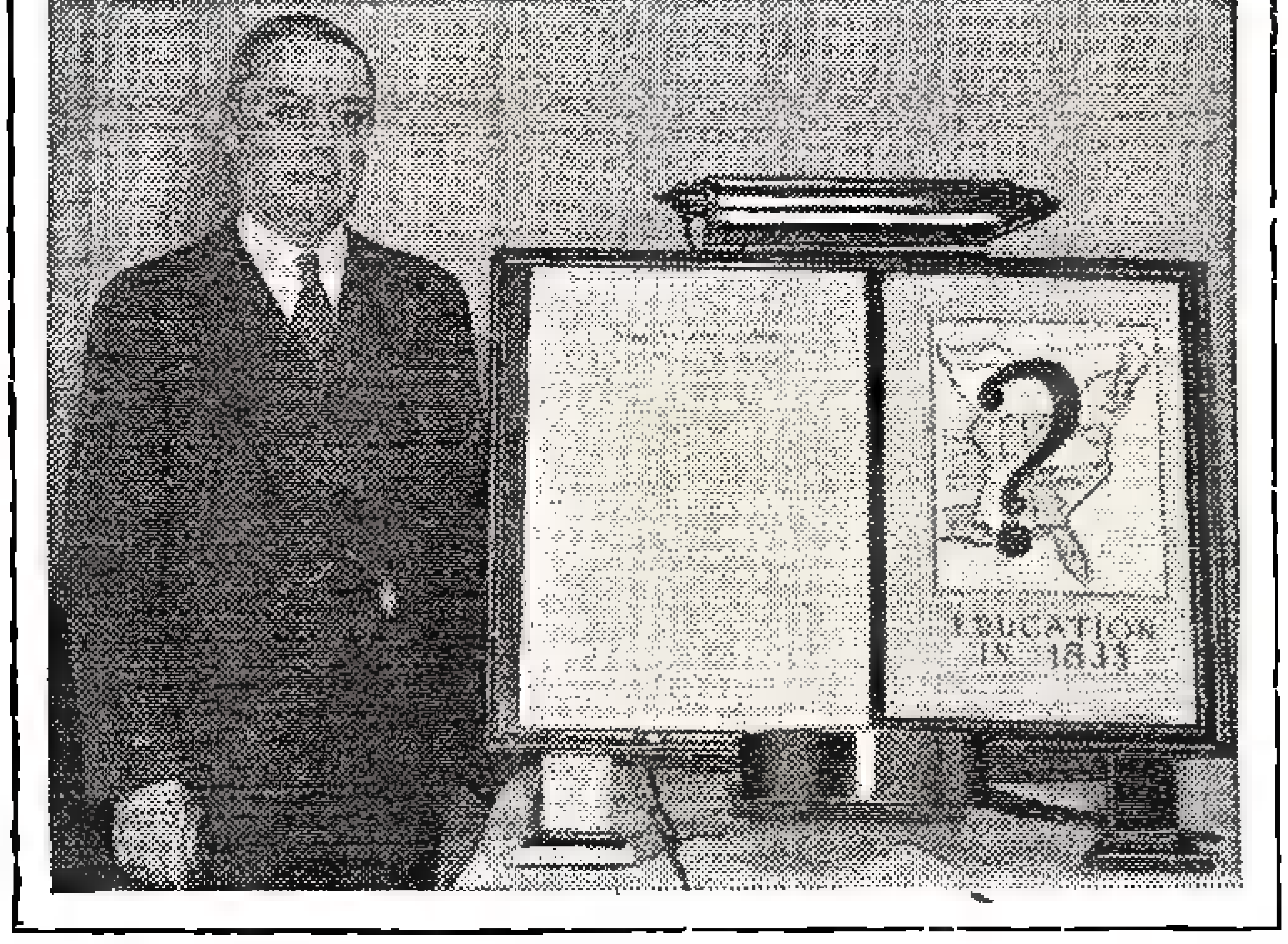
Artificial Opera Scenery on Lantern Slides


"SCENERY" PROJECTED ON SCREEN AT REAR OF STAGE
PROJECTING LANTERNS
SLIDE OF SUNBURST
CURVED SCREEN CREATES ILLUSION OF SPACE
DISTORTED SLIDE IMAGE PROJECTS NORMAL IMAGE ON CURVED SCREEN
SLIDE IMAGES SUPERIMPOSED ON SCREEN
SLIDE OF BLACK CROSS

Artificial scenery is projected on back-drop from lanterns in the rear of the stage as illustrated here, eliminating elaborate props. Images are superimposed on the screen to give a startling effect.

Book Turns Own Pages, Speaks

AN OUTSTANDING mechanical attraction of the World's Fair in Chicago is an "automatic talking book." Shown below, it's a book whose pages are almost exclusively devoted to illustrations. The cover opens automatically and the pages turn of their own free will. As the pages turn, a voice from a loud speaker lectures to you on the photos displayed at the moment. The voice is synchronized with the illustrations, so that you receive the impression that a human lecturer is speaking.


EDUCATION IN 1833

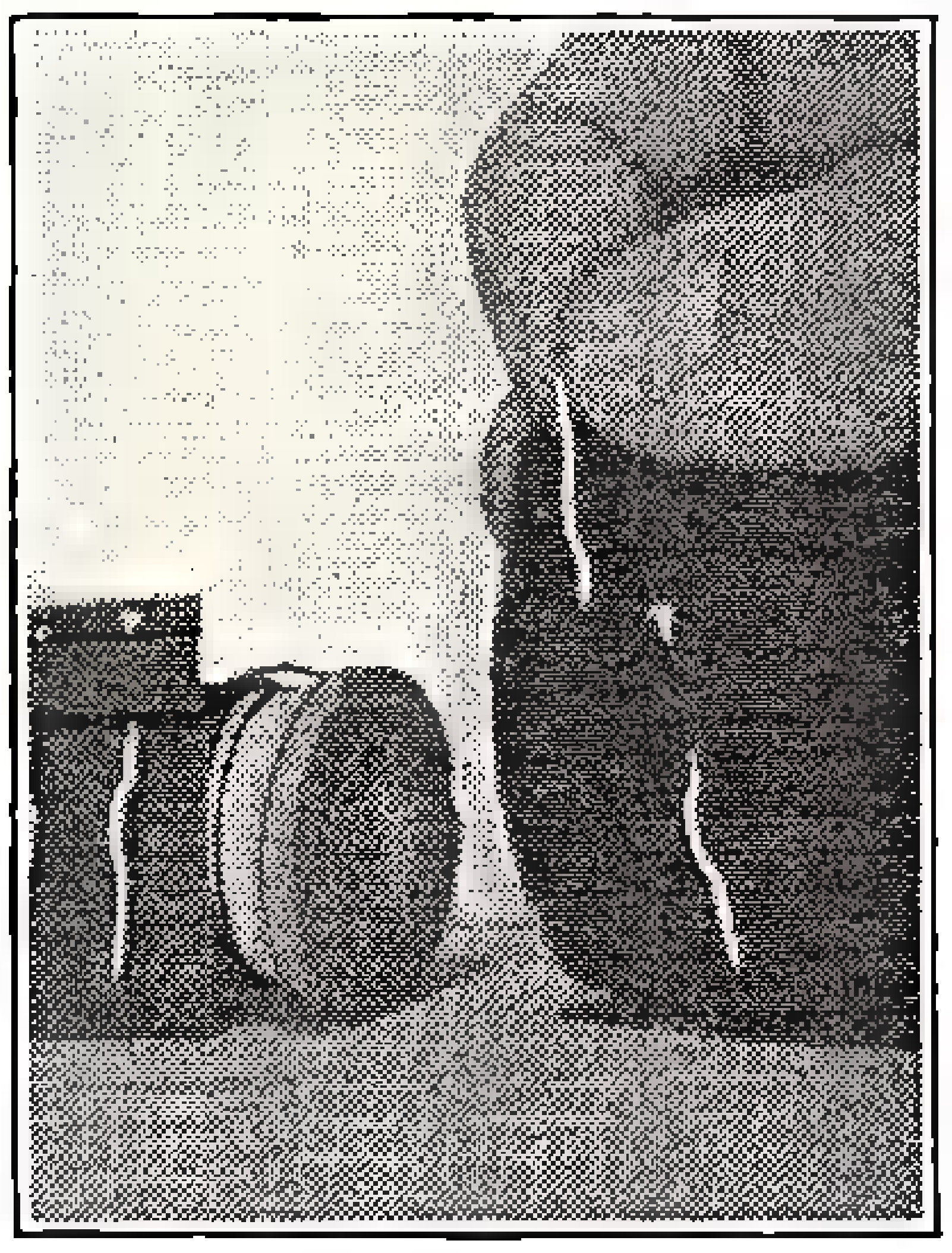
Outstanding attraction of Chicago Fair is this book which talks to you about pictures as pages turn automatically

THE necessity for economy was the mother of an invention which has eliminated elaborate operatic stage settings, substituting in their place a translucent back drop on which is projected the atmospheric scenery.

The "scenery" is painted on three lantern slides, as illustrated above, and is reproduced on the screen with a projecting lantern. Startling effects not obtainable with ordinary settings are achieved by superimposing the distorted images on a curved screen which gives a strange illusion of space.

Hump Makes New Pins Pull-proof

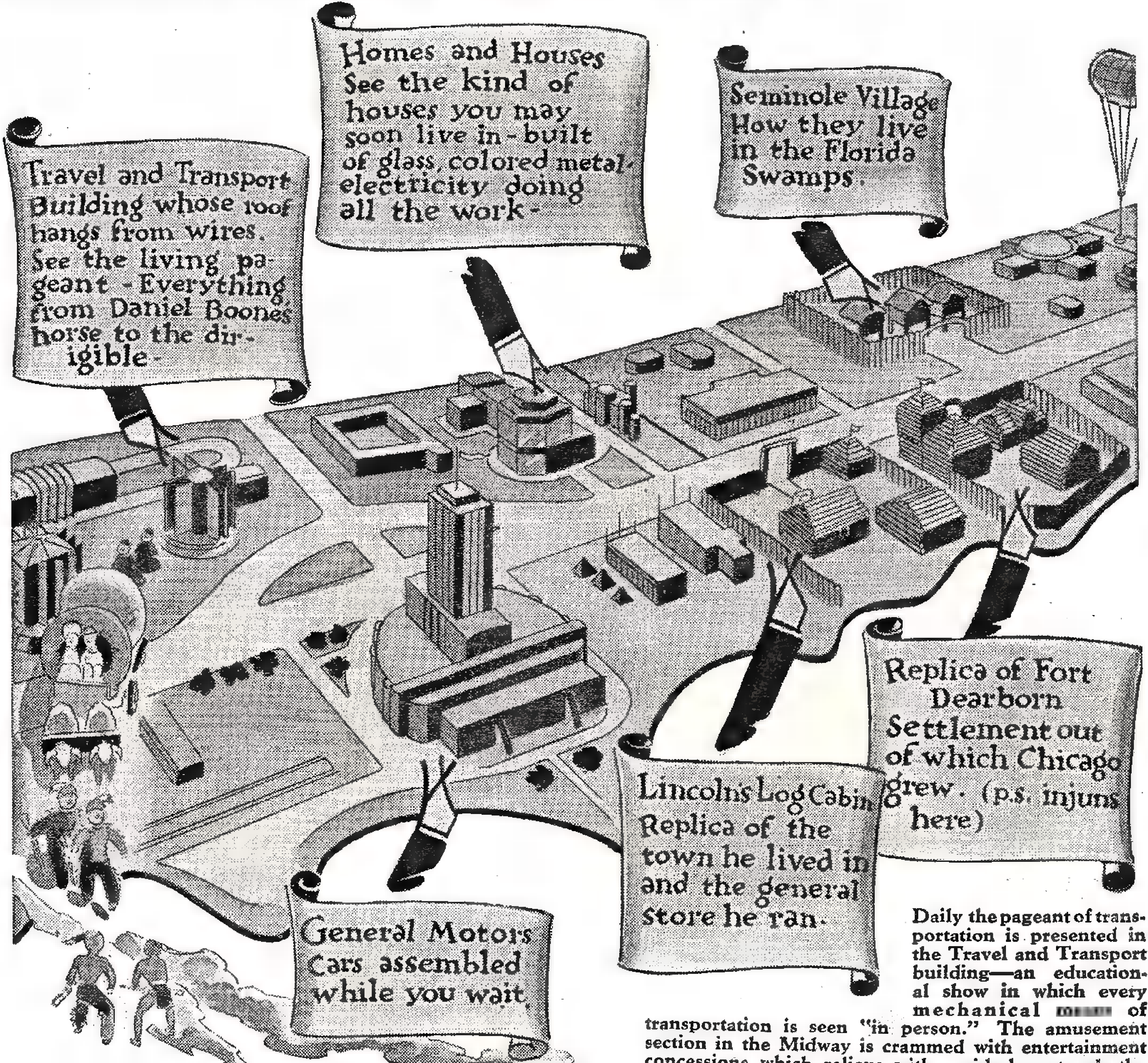
THE corkscrew has a mate in a new type of pin recently invented. Unlike its fellows, this new pin has a hump in the middle which makes the pin hold fast in any material. An attempt to remove it from the cloth makes the hump bind slightly in the hole, and it is this pressure which prevents the pin from working out.



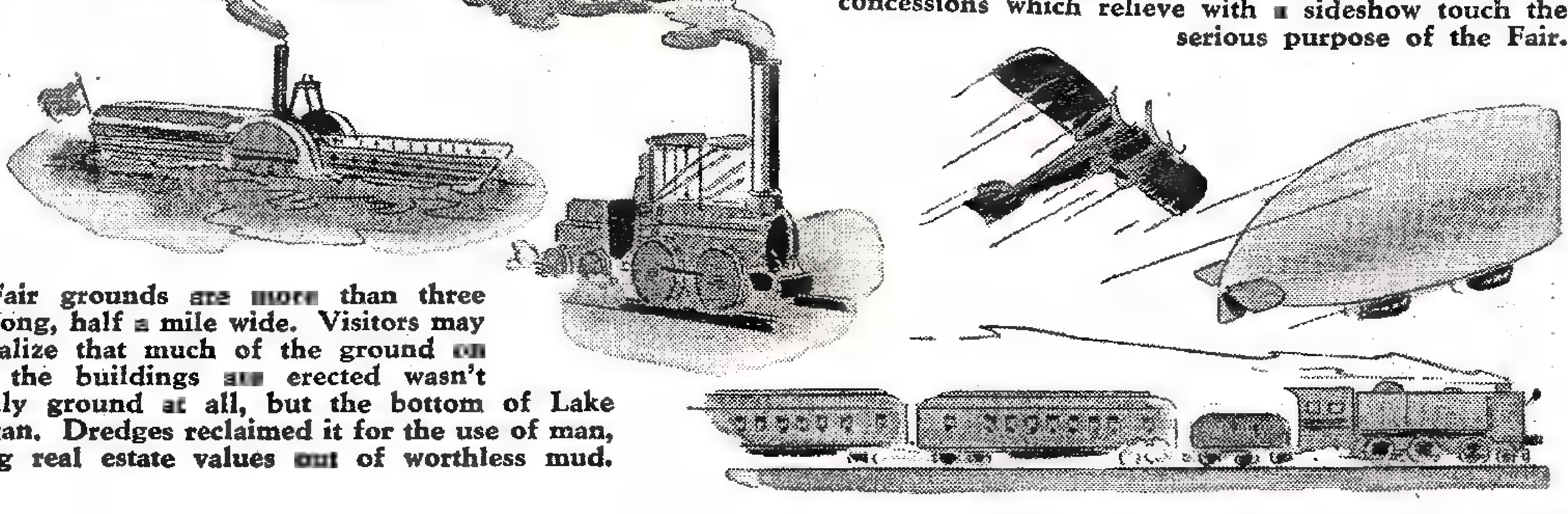
The hump on this new pin holds it firmly in any fabric.

THINGS You Mustn't Miss

CHICAGO'S Century of Progress Exposition—more familiarly known as the World Fair—has been open long enough for visitors to realize that if they are to "do" the show completely, passing up none of its features, they will have to devote all their waking hours for the next six months to the purpose. So crammed is the exposition with marvelous exhibits from all over the world that some sort of guide to the high spots will be welcomed—hence the picture map reproduced on these pages. It doesn't pretend to exhaust the possibilities of the Fair; it would take a volume about the size of an unabridged dictionary to do that. But it does point out features which early Fair visitors have found to be the most interesting of them all. If you have only a day or two at the show, take the map along for your guidance.

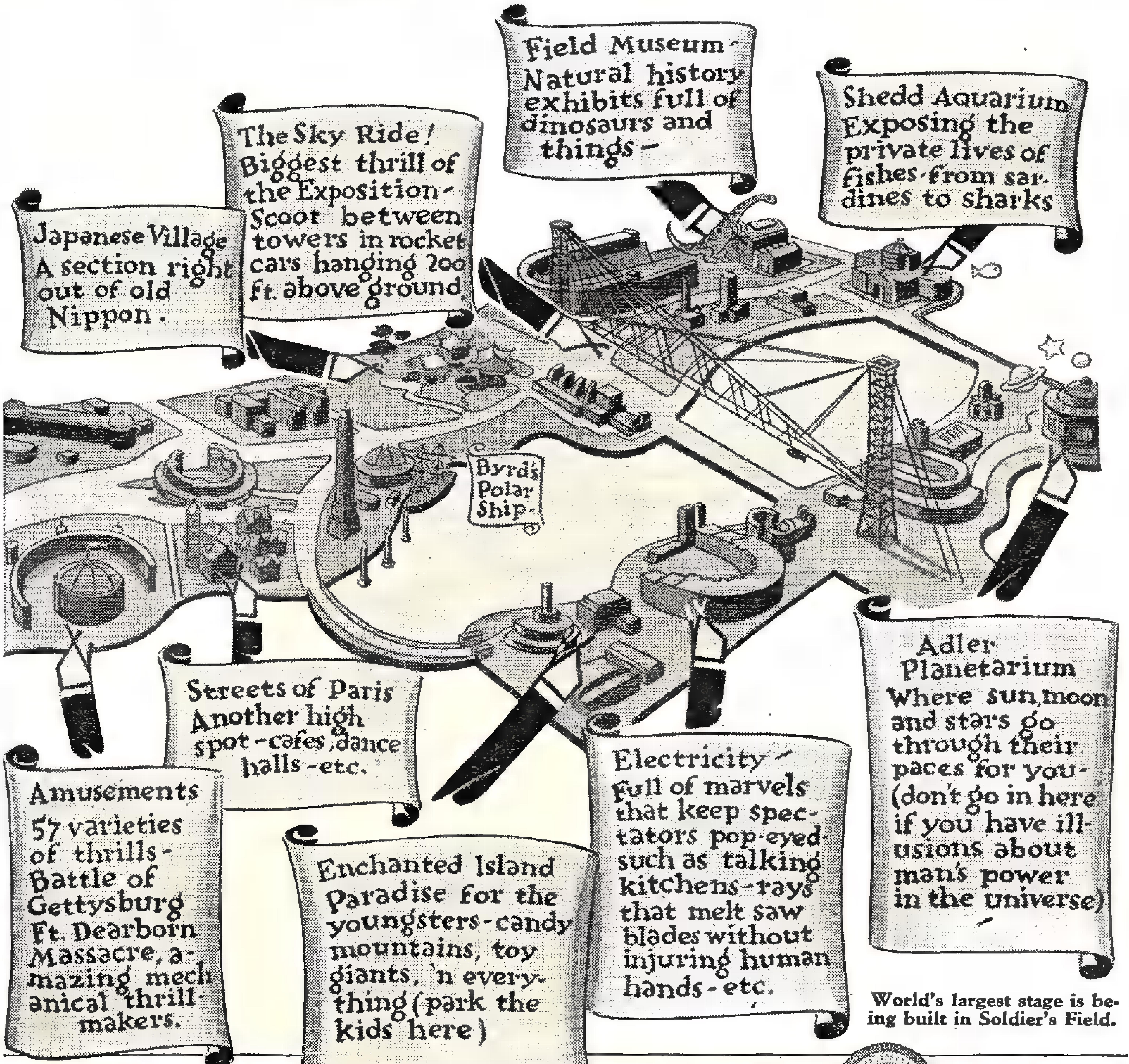

Travel and Transport Building whose roof hangs from wires. See the living pageant - Everything from Daniel Boones horse to the dirigible -
Homes and Houses See the kind of houses you may soon live in - built of glass, colored metal - electricity doing all the work -
Seminole Village How they live in the Florida Swamps.
Replica of Fort Dearborn Settlement out of which Chicago grew. (p.s. injuns here)
Lincoln's Log Cabin Replica of the town he lived in and the general store he ran.
General Motors Cars assembled while you wait.

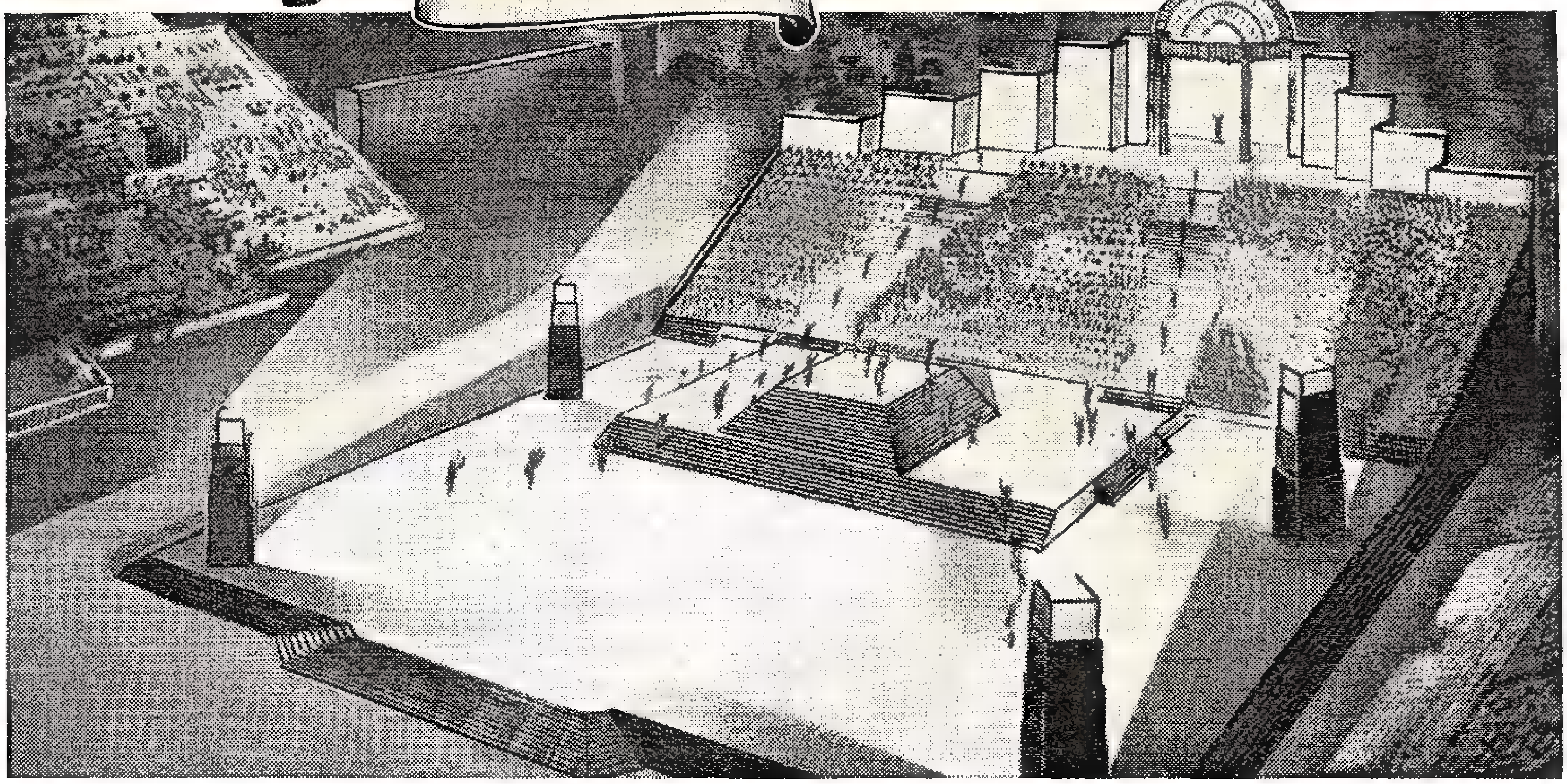
Daily the pageant of transportation is presented in the Travel and Transport building—an educational show in which every mechanical means of transportation is seen "in person." The amusement section in the Midway is crammed with entertainment concessions which relieve with a sideshow touch the serious purpose of the Fair.



The Fair grounds are more than three miles long, half a mile wide. Visitors may not realize that much of the ground on which the buildings are erected wasn't naturally ground at all, but the bottom of Lake Michigan. Dredges reclaimed it for the use of man, creating real estate values out of worthless mud.

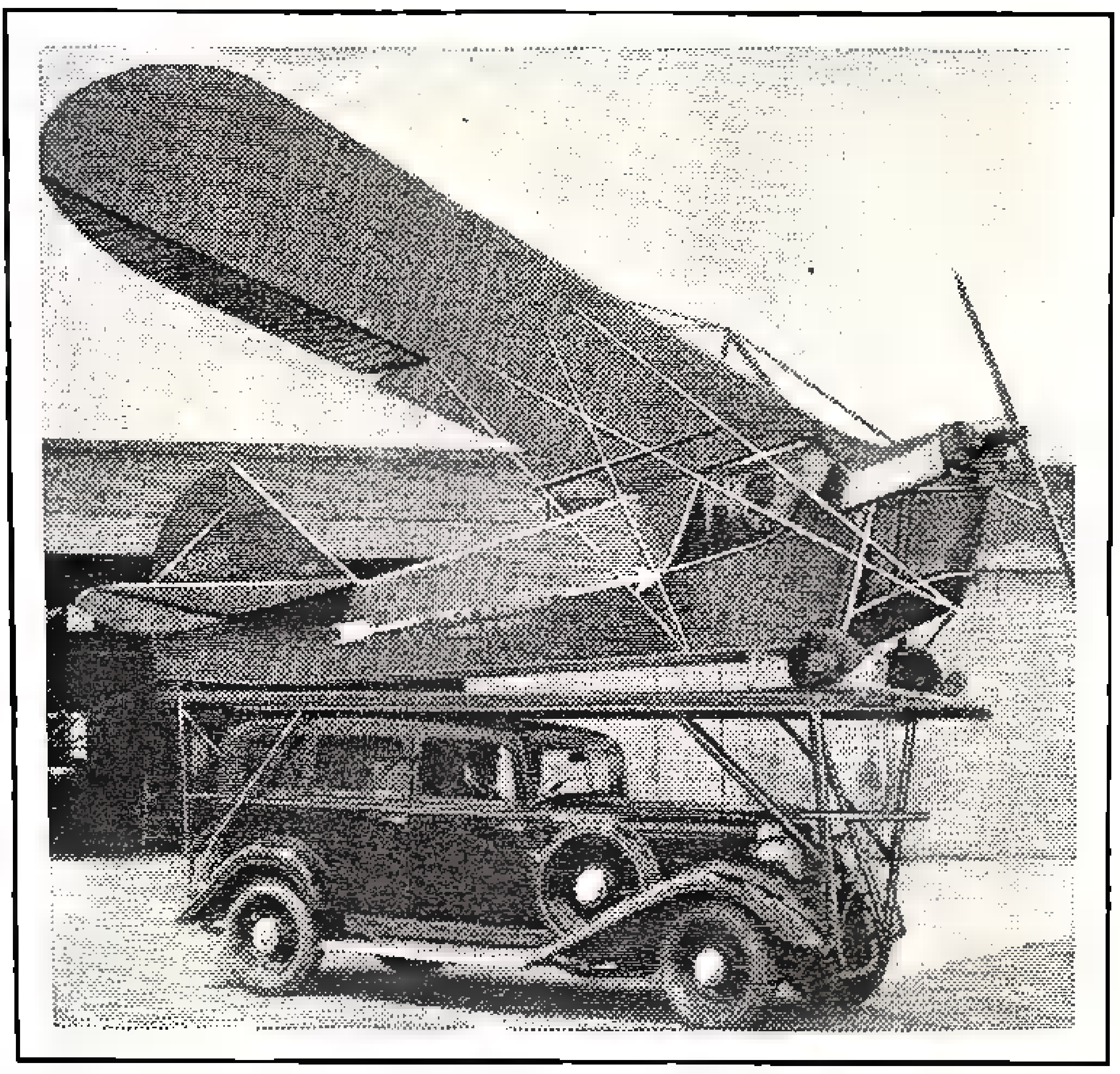
at Chicago's WORLD Fair


Field Museum - Natural history exhibits full of dinosaurs and things -
The Sky Ride! Biggest thrill of the Exposition - Scoot between towers in rocket cars hanging 200 ft. above ground
Shedd Aquarium Exposing the private lives of fishes - from sardines to sharks
Japanese Village A section right out of old Nippon.
Byrd's Polar Ship.
Streets of Paris Another high spot - cafes, dance halls - etc.
Adler Planetarium Where sun, moon and stars go through their paces for you - (don't go in here if you have illusions about man's power in the universe)
Amusements 57 varieties of thrills - Battle of Gettysburg Ft. Dearborn Massacre, amazing mechanical thrill-makers.
Enchanted Island Paradise for the youngsters - candy mountains, toy giants, 'n everything (park the kids here)
Electricity - Full of marvels that keep spectators pop-eyed - such as talking kitchens - rays that melt saw blades without injuring human hands - etc.



World's largest stage is being built in Soldier's Field.

Police Planes Take Off From Car to Hunt Down Crooks



When alarm comes in, Oregon state police pursue fugitive criminals in this small plane, which takes off from platform mounted on top of a touring car as shown above.

FUGITIVE criminals stand little chance of escape when the Oregon State police take out after them. They are hunted down from the air by a plane that takes off from the top of an automobile, which then goes after the felons on the ground.

How the scheme works is illustrated at the left. The small plane rests on a platform on the top of a sedan and has folding wings to facilitate storage. When an alarm comes in, the wings are unfolded, the motor car speeds up to 25 miles per hour, and the ship takes to the air in search of the fugitives. Dick Rankin, Portland, Oregon, aviator, is the originator of the stunt.

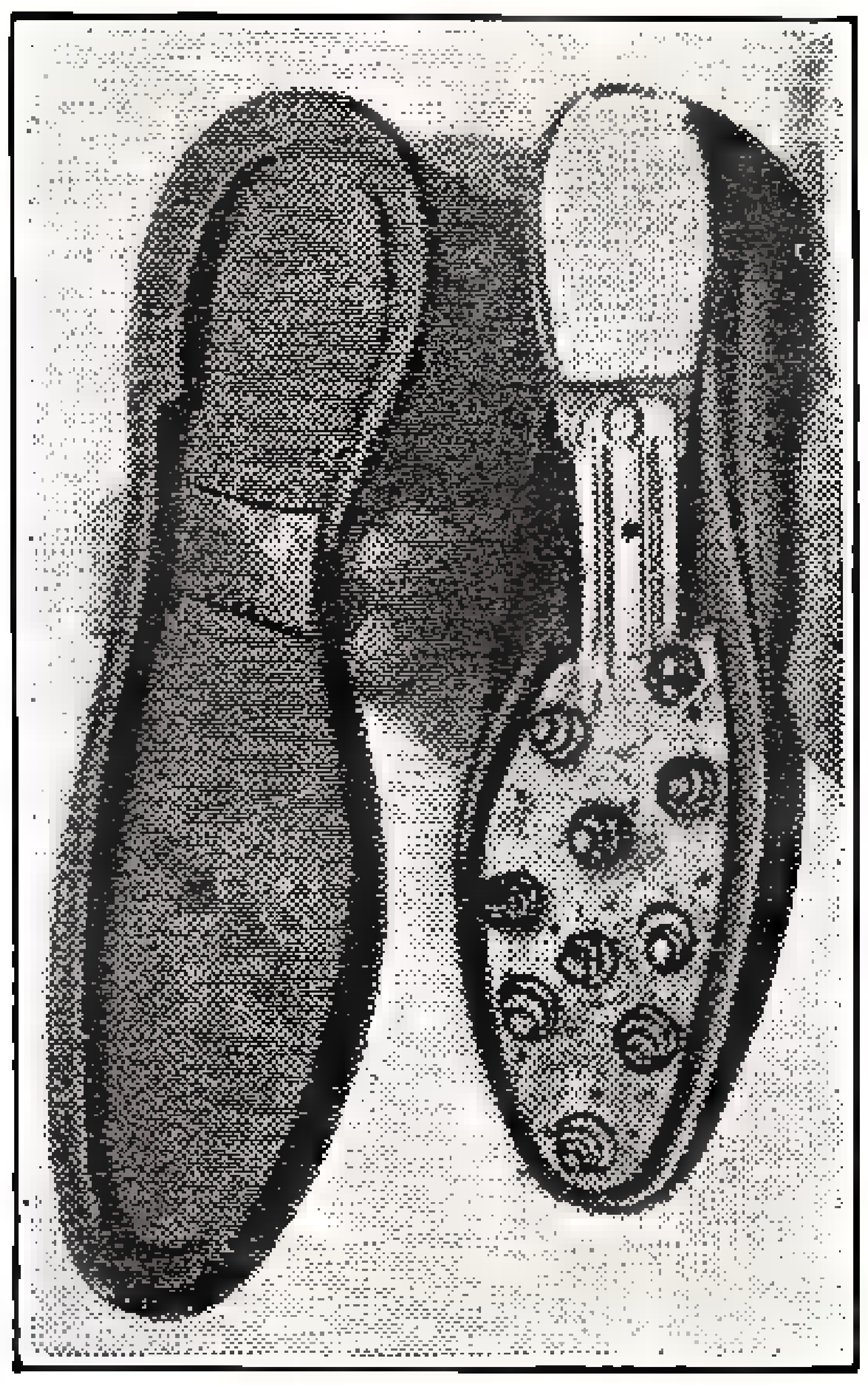
Skunk Odor Saves Miners' Lives

THE smell of a skunk as a danger signal in mines, warning everybody to get out quickly in case of fire or explosion, has proved its value in Canadian mines according to recent government reports.

Sealed bottles of a chemical having a skunk-like odor, are kept at hand in blower houses or similar places through which air is supplied to the mines. In case of an alarm the engineer in charge breaks bottles of the malodorous chemical in the air ducts leading to the mine.

Coils in Soles Give Springy Step

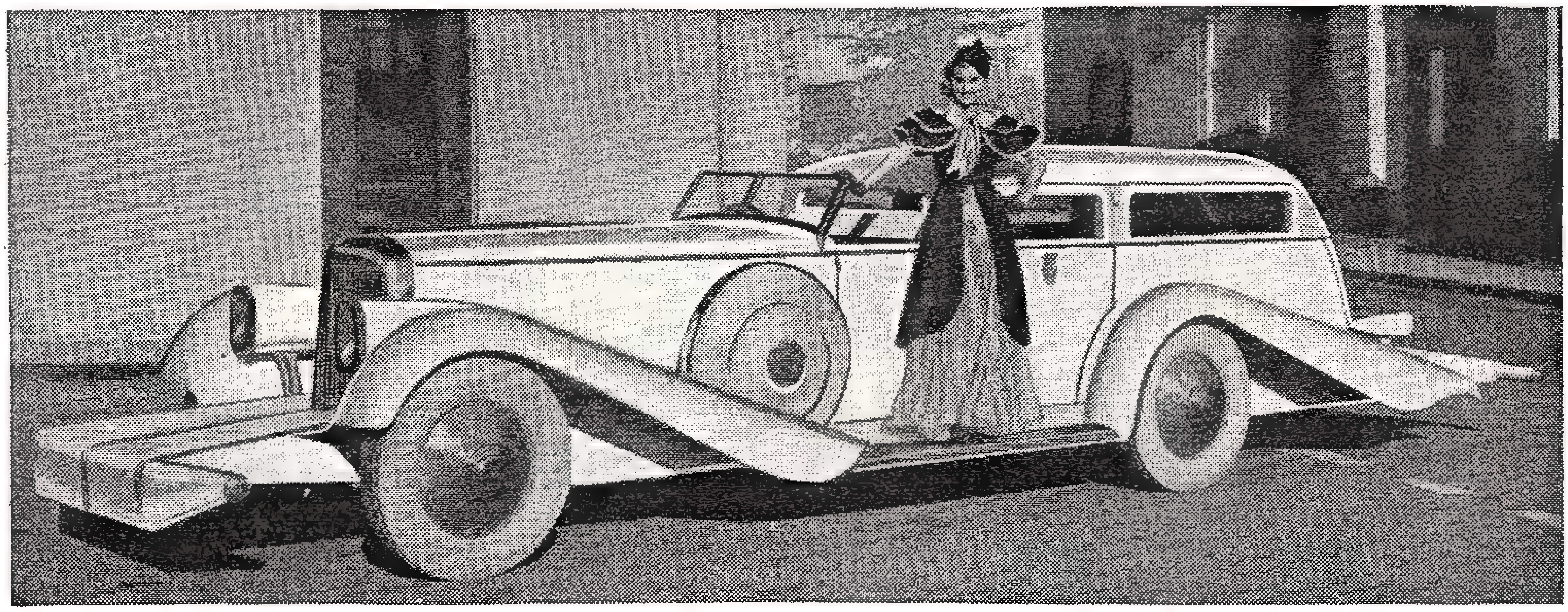
THE springiness provided in the soles of a new type of shoe on the market greatly reduces the shock of walking on hard sidewalks. As shown at the right, the coil springs are fastened to a metal plate that is inserted between the inner and outer soles. In actual tests the cushioning effect of the shoe proved to be superior to that given by rubber, inventor claims.



Springs in soles of shoes absorb shock of walking on concrete.

Movie Mechanics Rebuild 13-year-old Car Into Ultra-Modern Limousine

HOLLYWOOD was set agog recently when an automobile of startling, ultra-modernistic design appeared on the streets. The creation, shown below, was the work of Hollywood carriage-makers, who built it from an old bus that had been prowling the streets since 1920. The "chariot on wheels," as the bus is called, is to be used in a movie telling a fantastic story of events in a mythical kingdom. Though the car seems to represent a fabulous cost, in reality it cost less than the price of two small cars.



Latest creation from Hollywood—a sumptuous automobile made from old car for appearance in mythical kingdom picture.

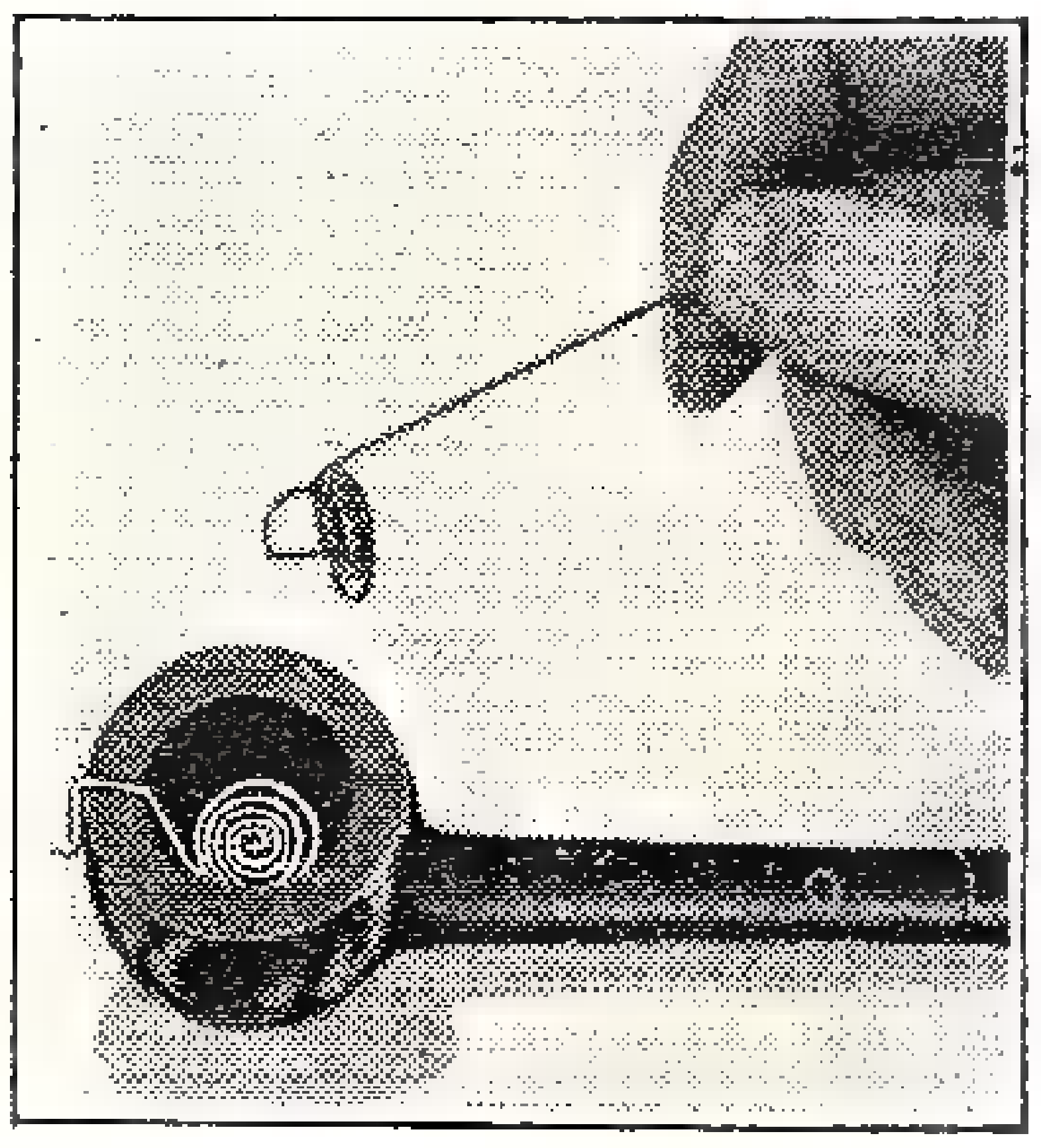
Balloons to Fly in Tandem to Check Stratosphere Speed

A REPETITION of Professor Piccard's stratosphere balloon flight made last year, but using two balloons in tandem instead of the one balloon, has been approved by the Belgian National Fund for Scientific Research.

Previous flights were handicapped by the fact that both ascent and descent happened too quickly, so that many observations planned for intermediate heights could not be made. That is the reason for the plan of a second balloon, fastened below the chief one, as a kind of aerial brake.

This lower balloon will be piloted by an aeronaut in an open basket. The tandem arrangement is expected to rise about six miles, where both balloons will hover for several hours to make observations.

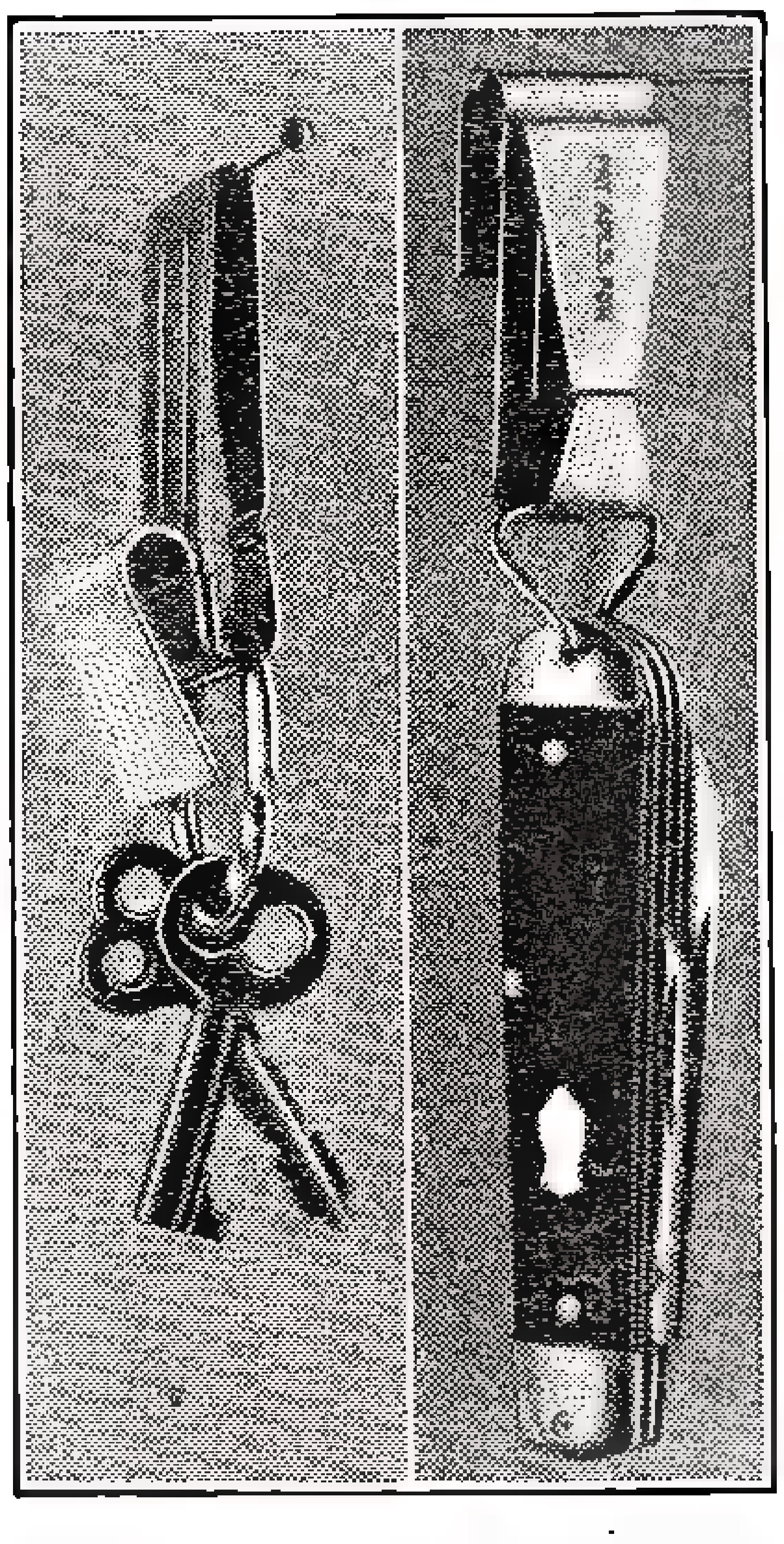
Pipe Grid Keeps Tobacco Dry



Coil grid placed in pipe prevents tobacco from becoming moist.

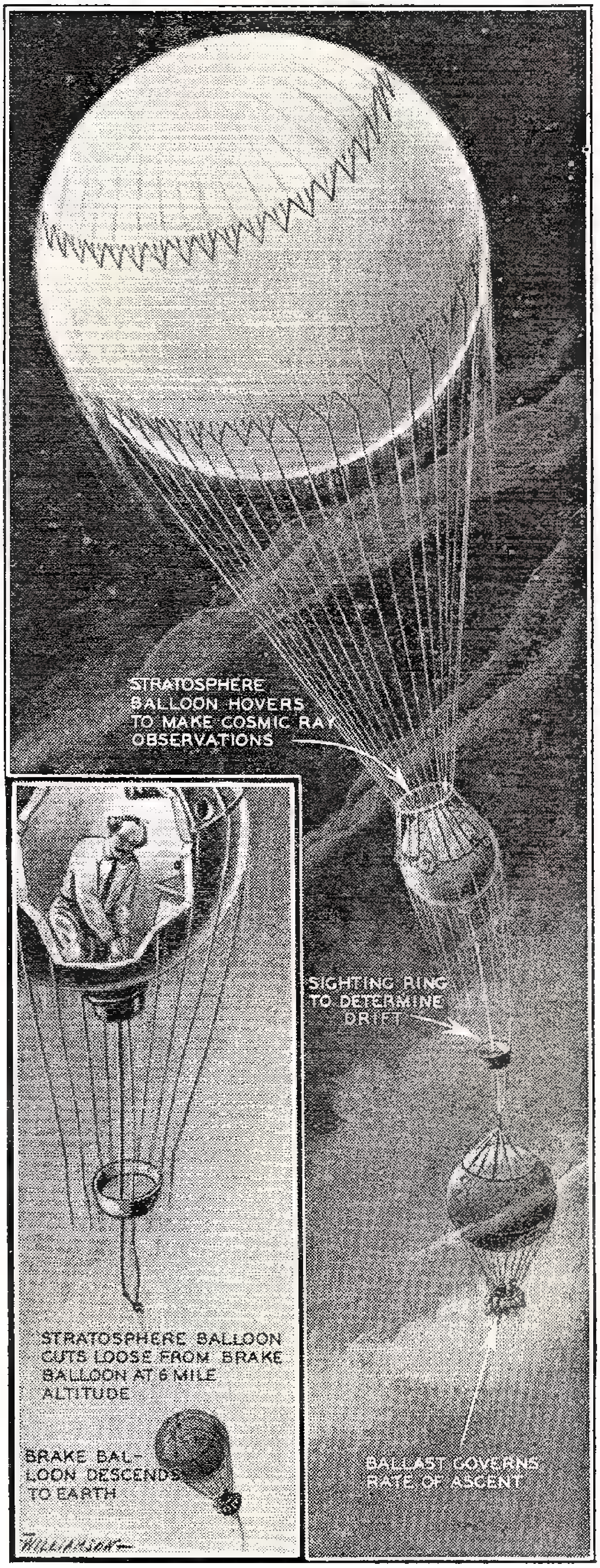
A TINY coil grid built especially for use in pipes prevents tobacco from being packed down into the wet bowl. The cooling air space keeps the weed dry as it burns down towards the bottom. When the tobacco in the pipe is firmly tamped down it is said to dry like a well made cigar. The grid is made of especially tempered alloy and will outlast the average pipe.

Key Ring Hooks to Clothing



New key ring attaches to belt or any part of the clothing.

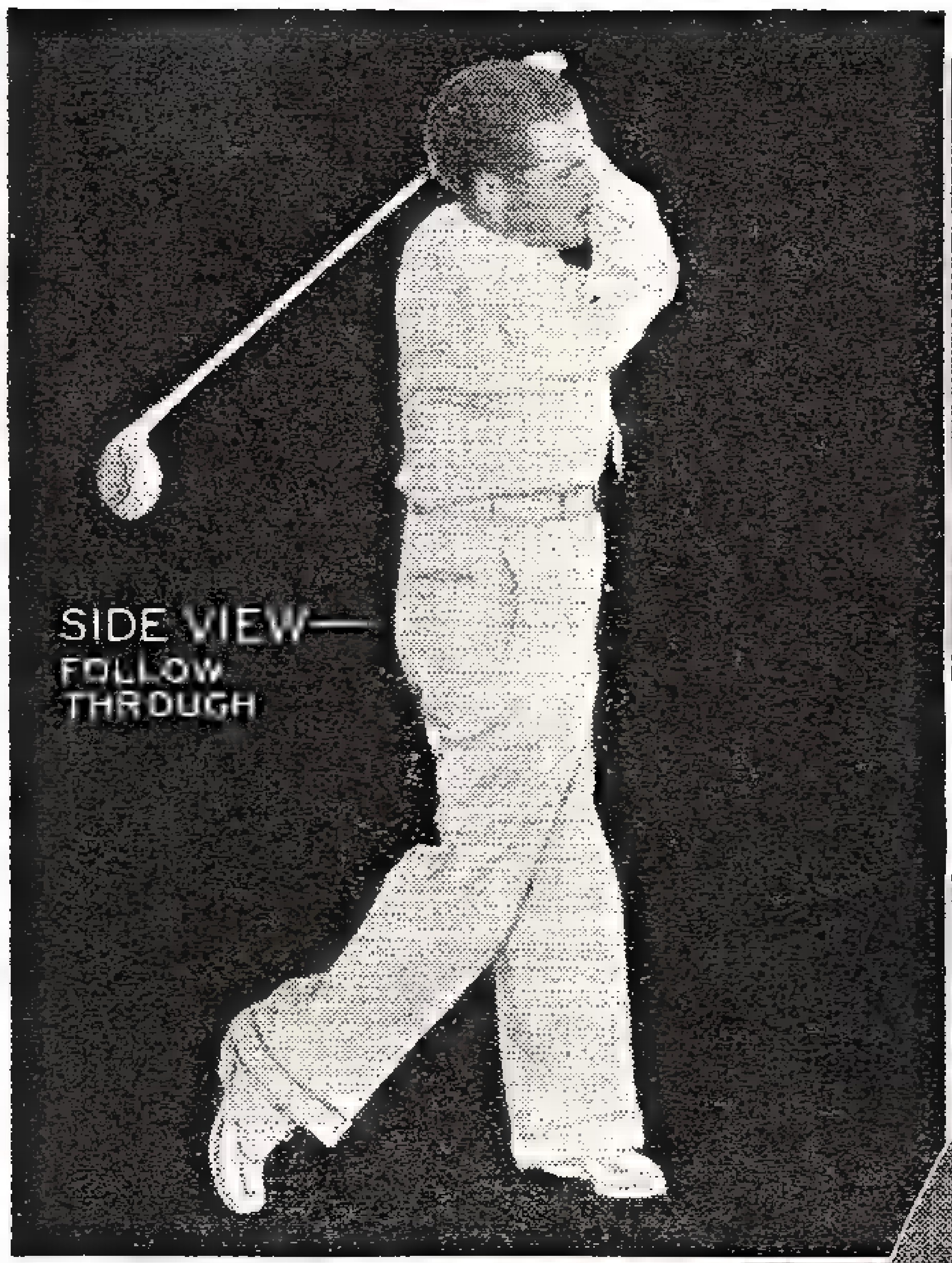
A SIMPLE, safe and handy key ring, which can be attached to the belt or any part of the clothing, has just been patented by a Los Angeles inventor. The hook, shown at the left, is made from two pieces of tempered spring steel. The front piece carries the ring, and, being rigid, may be pushed down, allowing the two small, sharp prongs to sink into the belt or cloth to which you want it fastened.


STRATOSPHERE BALLOON HOVERS TO MAKE COSMIC RAY OBSERVATIONS
SIGHTING RING TO DETERMINE DRIFT
STRATOSPHERE BALLOON CUTS LOOSE FROM BRAKE BALLOON AT 6 MILE ALTITUDE
BRAKE BALLOON DESCENDS TO EARTH
BALLAST GOVERNS RATE OF ASCENT
WILLIAMSON

Drawing shows how balloon will be hooked to stratosphere gondola to prevent too rapid ascent into rarified atmosphere.

HERE'S a formula for removing old oil, paint, or varnish coats: Apply a mixture of about 5 parts of potassium silicate (water glass 36 per cent), about 1 part lye or soda (40 per cent) and 1 part ammonia. The composition dissolves the old varnish.

TRICK Camera Shots Help



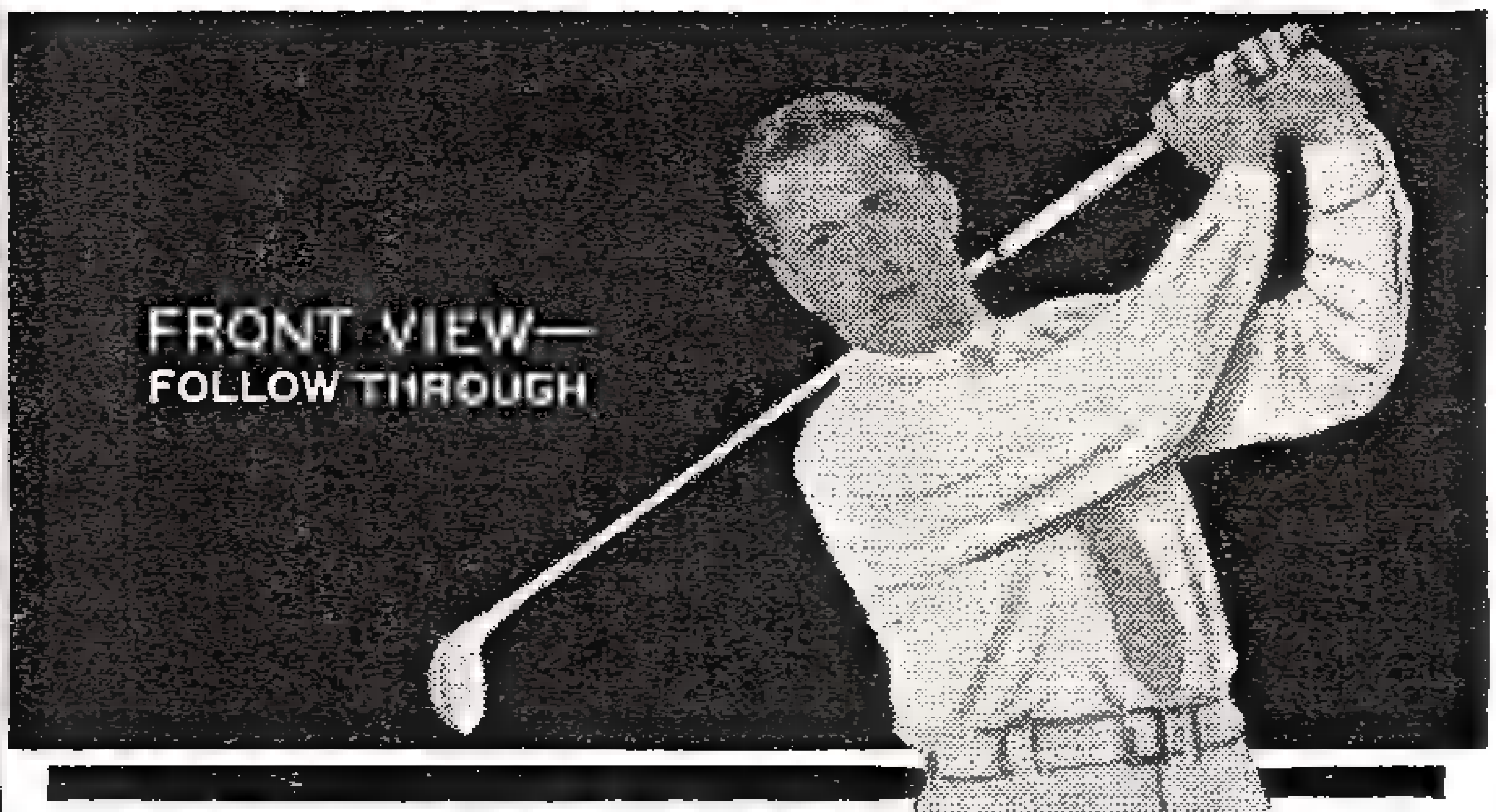
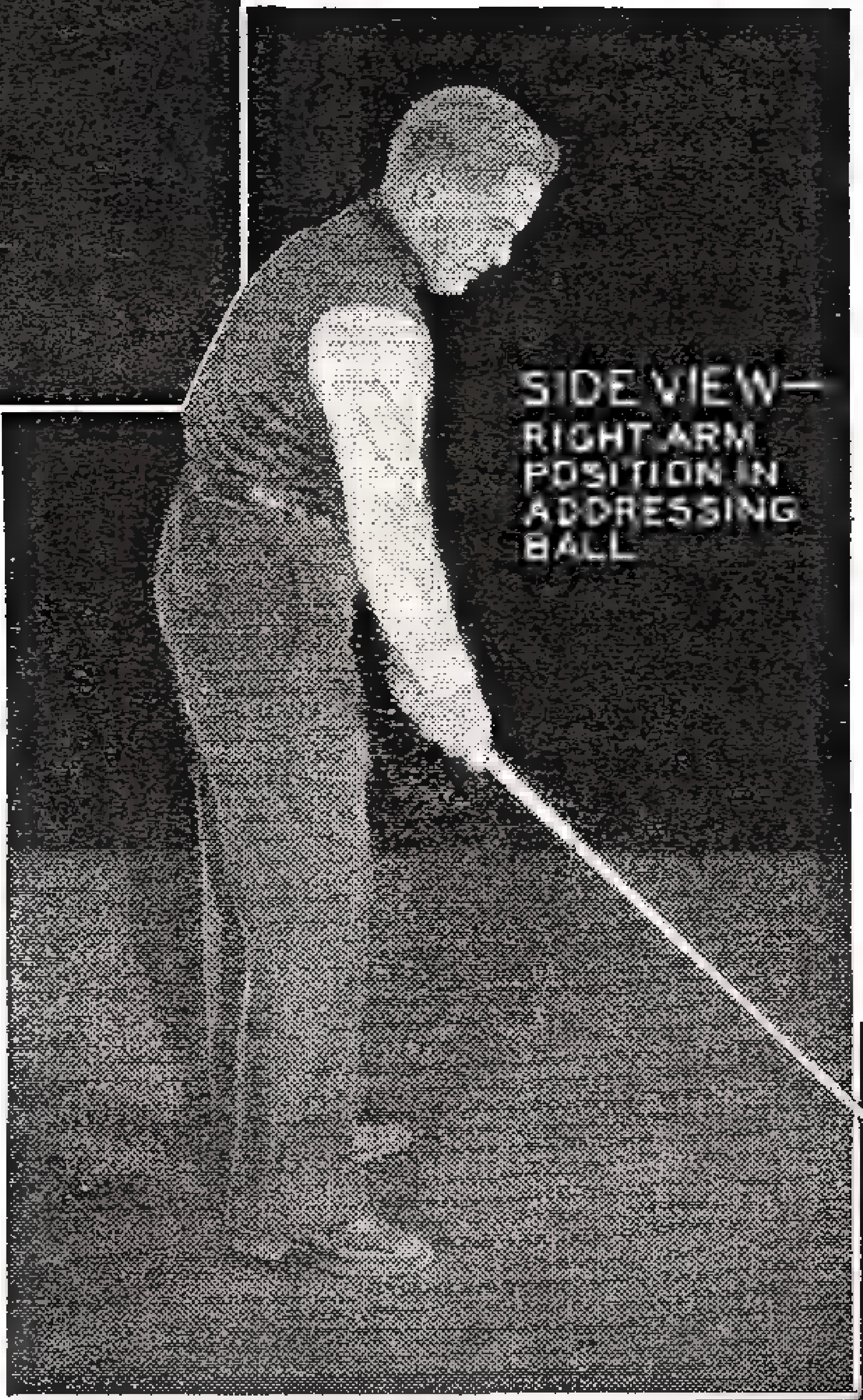
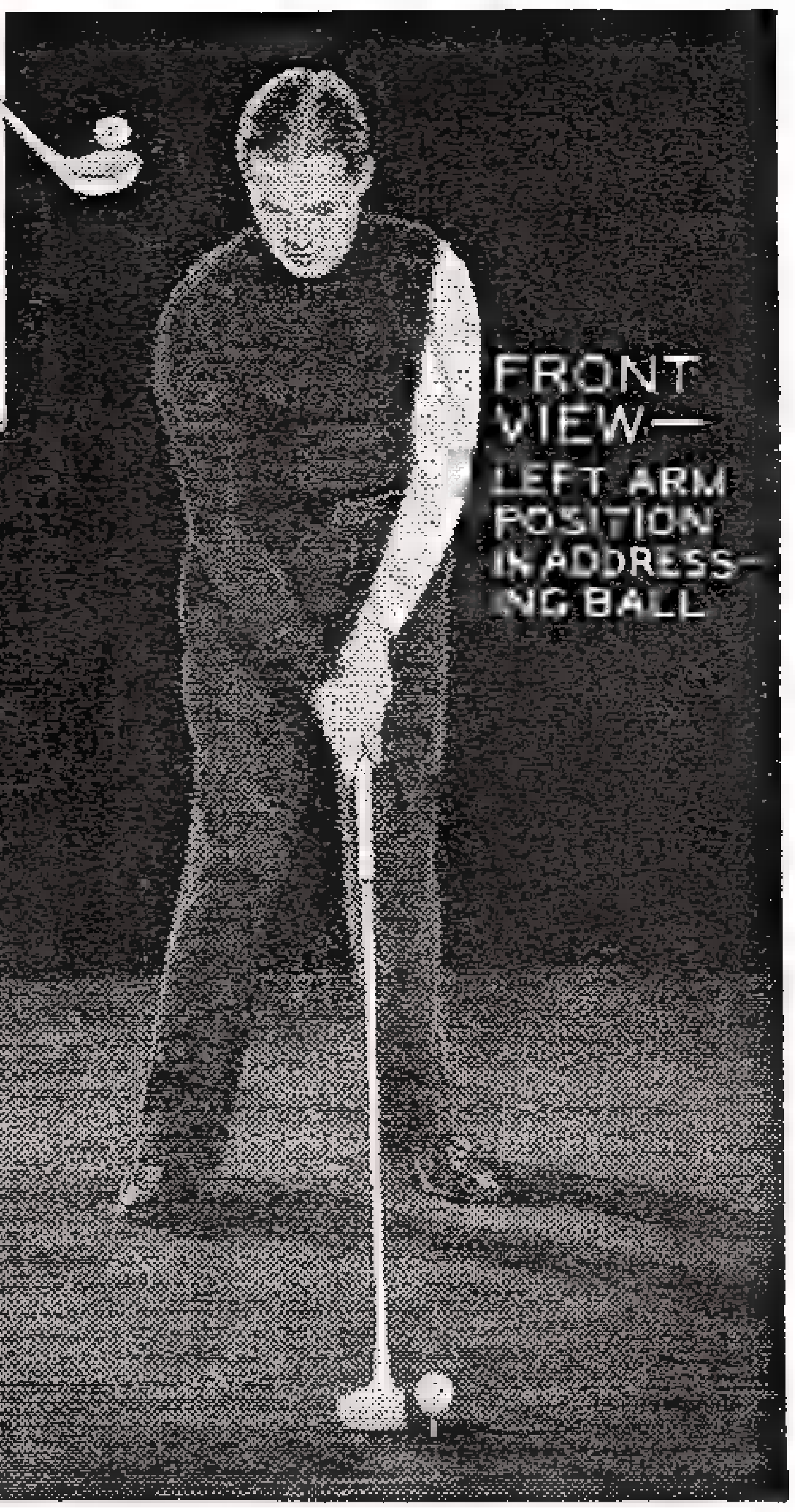


Photo at right shows how to bring the powerful muscles of the mid-section of body into action behind the stroke.


SIDE VIEW—
RIGHT ARM POSITION IN ADDRESSING BALL

Above—All in white, Bobby shows correct position of the entire body in following through after hitting the ball. Right—his right arm, standing out in dazzling white contrast, in proper position for addressing ball.

Photo below shows position of left arm. Note also how Bobby stands behind the ball permitting him to move into the shot as he swings.


FRONT VIEW—
LEFT ARM POSITION IN ADDRESSING BALL

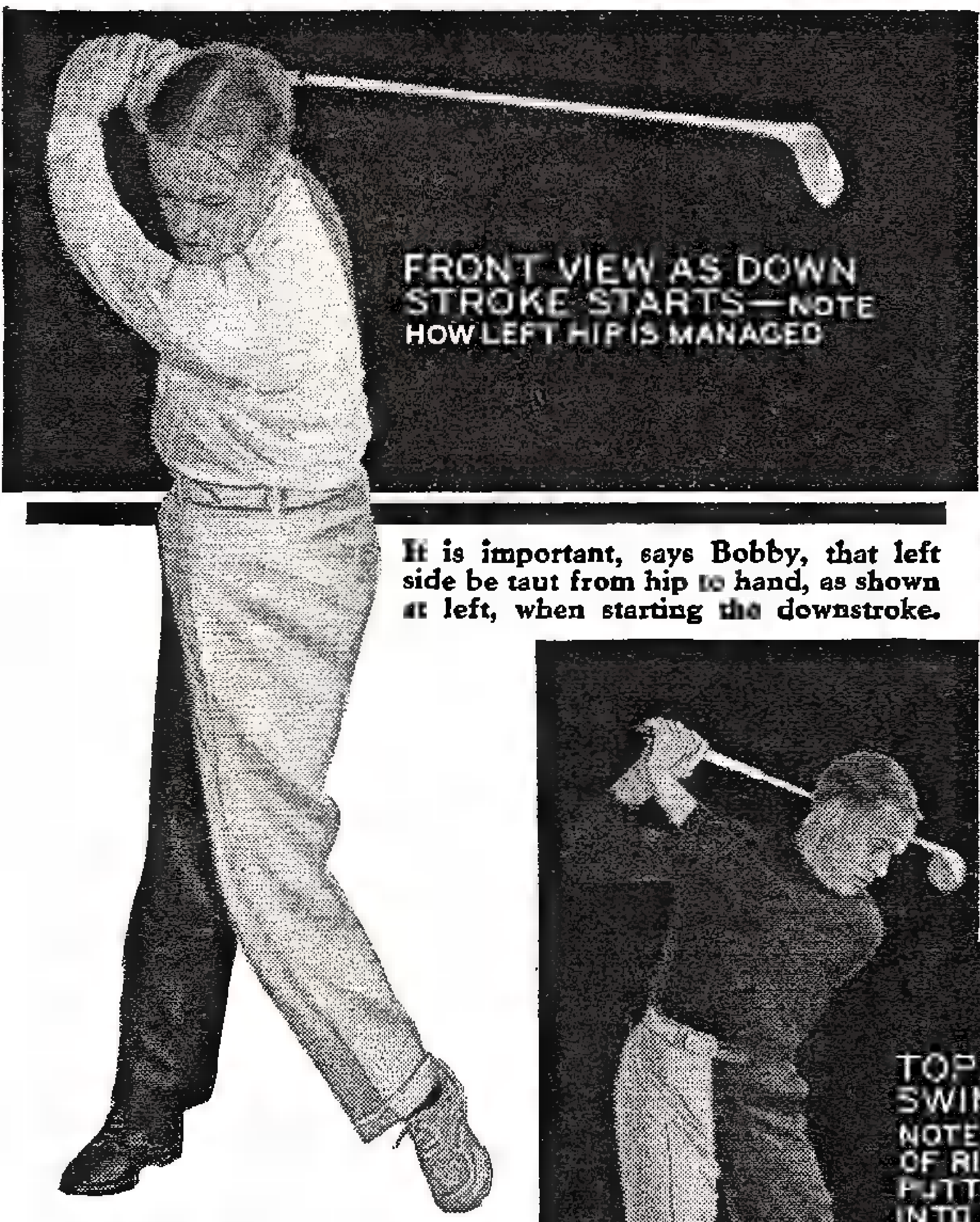
THE use of the movie camera in teaching golf is nothing new—it's been used any number of times to explain fine points of the game's technique in such a manner that Mr. Duffer can presumably go out on the course, after studying the movie, and wind up joyfully at the 18th hole with a card of 120 or thereabouts, representing something like a 25-point improvement.

But it has remained for Bobby Jones, king of them all, to devise some brand new photographic tricks for his new Warner Brothers movie "How to Break 90." In addition to stop-motion photography, which enables Bobby to halt his swing in mid-air while he stands alongside himself and explains what he is doing, he wears an assortment of trick black and white costumes which emphasize the action of different parts of the body in executing the perfect golf stroke.

Some of the striking results of this photographic technique are presented on these pages. With Bobby standing against a black backdrop, dressed entirely in black except for the limb clad in dazzling white whose action is explained, the eye is not distracted by extraneous details.

Essential points of the Jones golf technique are brought out in these photos for the benefit of MODERN MECHANIX AND INVENTIONS readers who may wish to

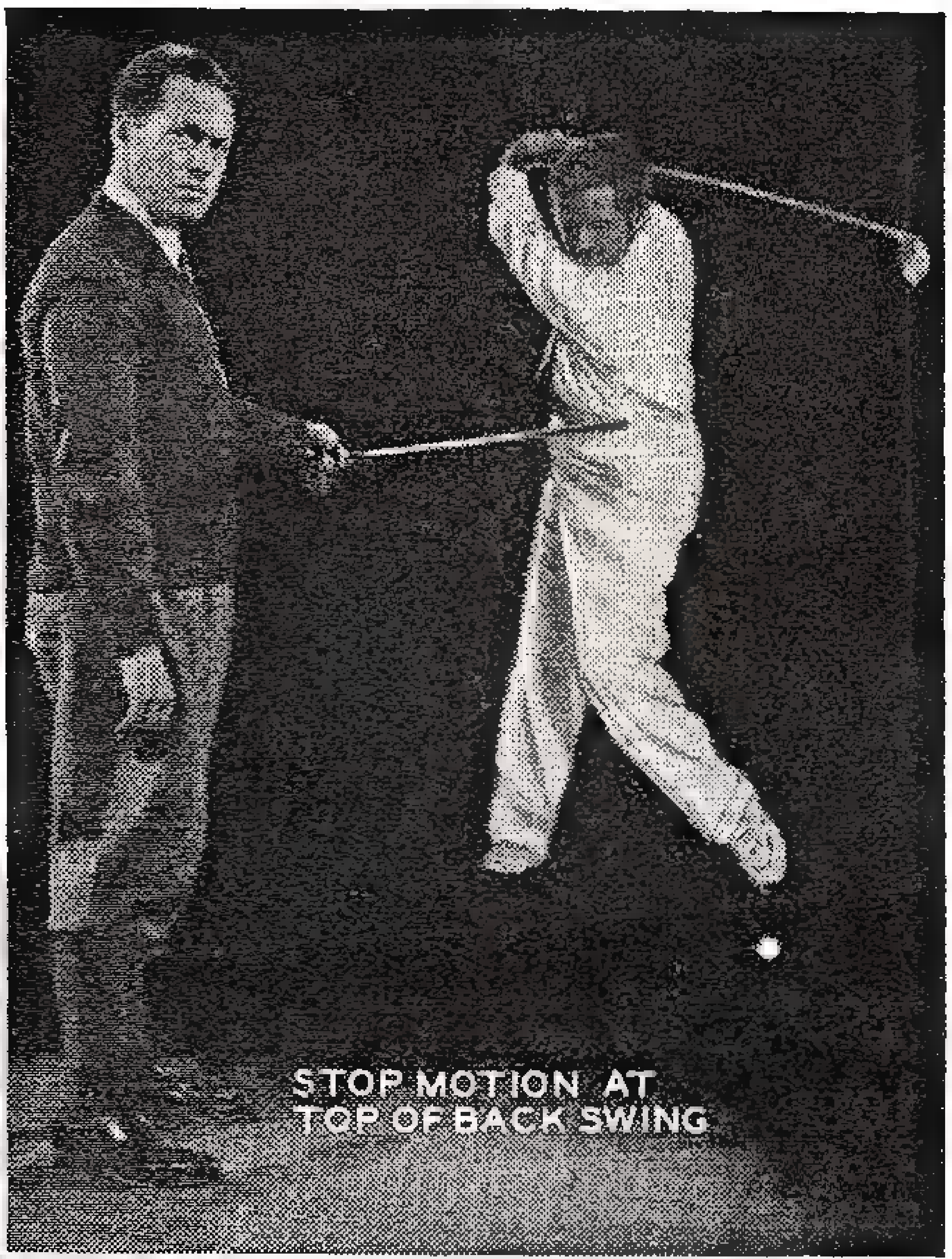
BOBBY JONES Teach Golf



FRONT VIEW AS DOWN STROKE STARTS—NOTE HOW LEFT HIP IS MANAGED

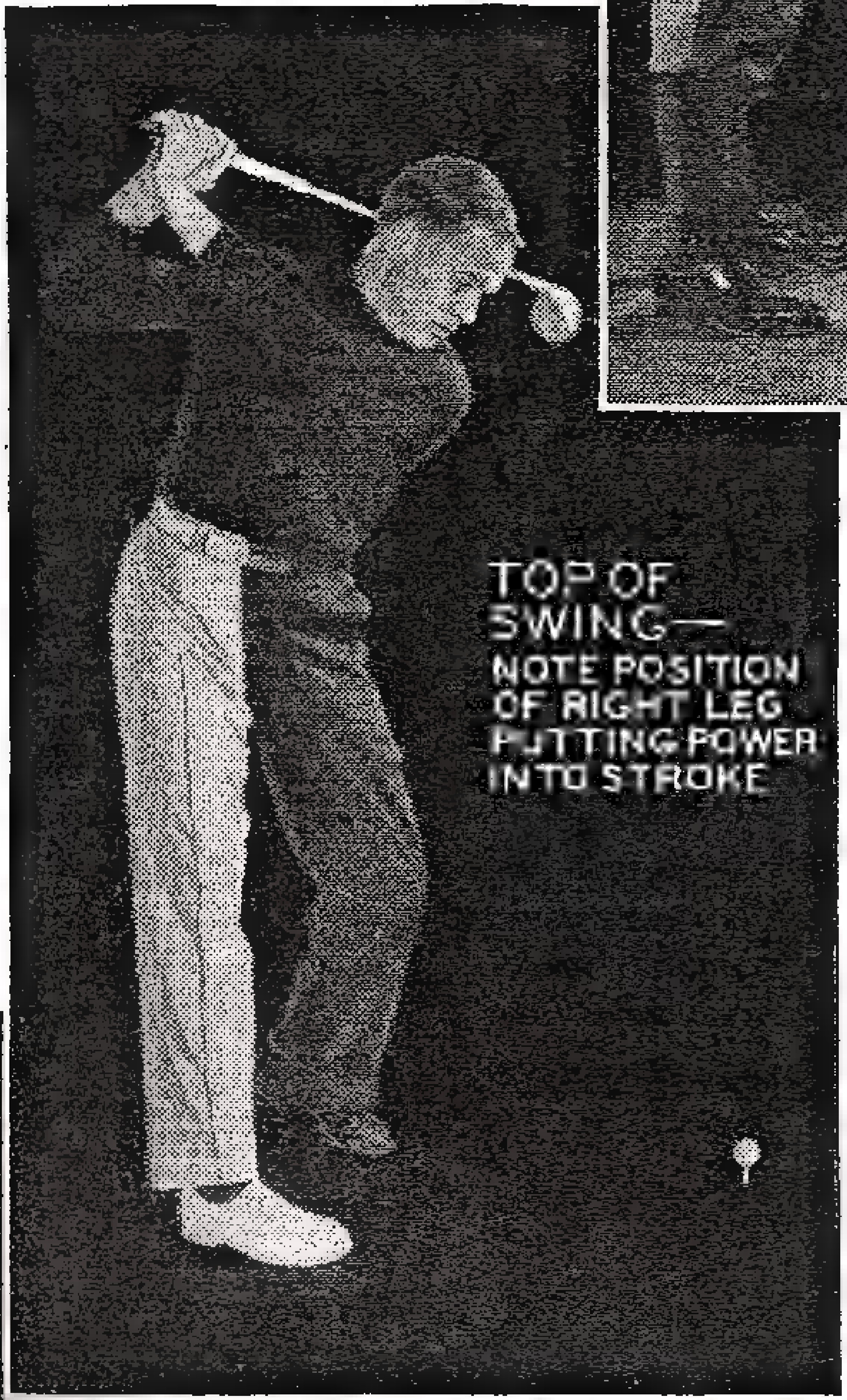
It is important, says Bobby, that left side be taut from hip to hand, as shown at left, when starting the downstroke.

Downstroke swing should be initiated by the hips rather than arms. Photo below shows proper grip.

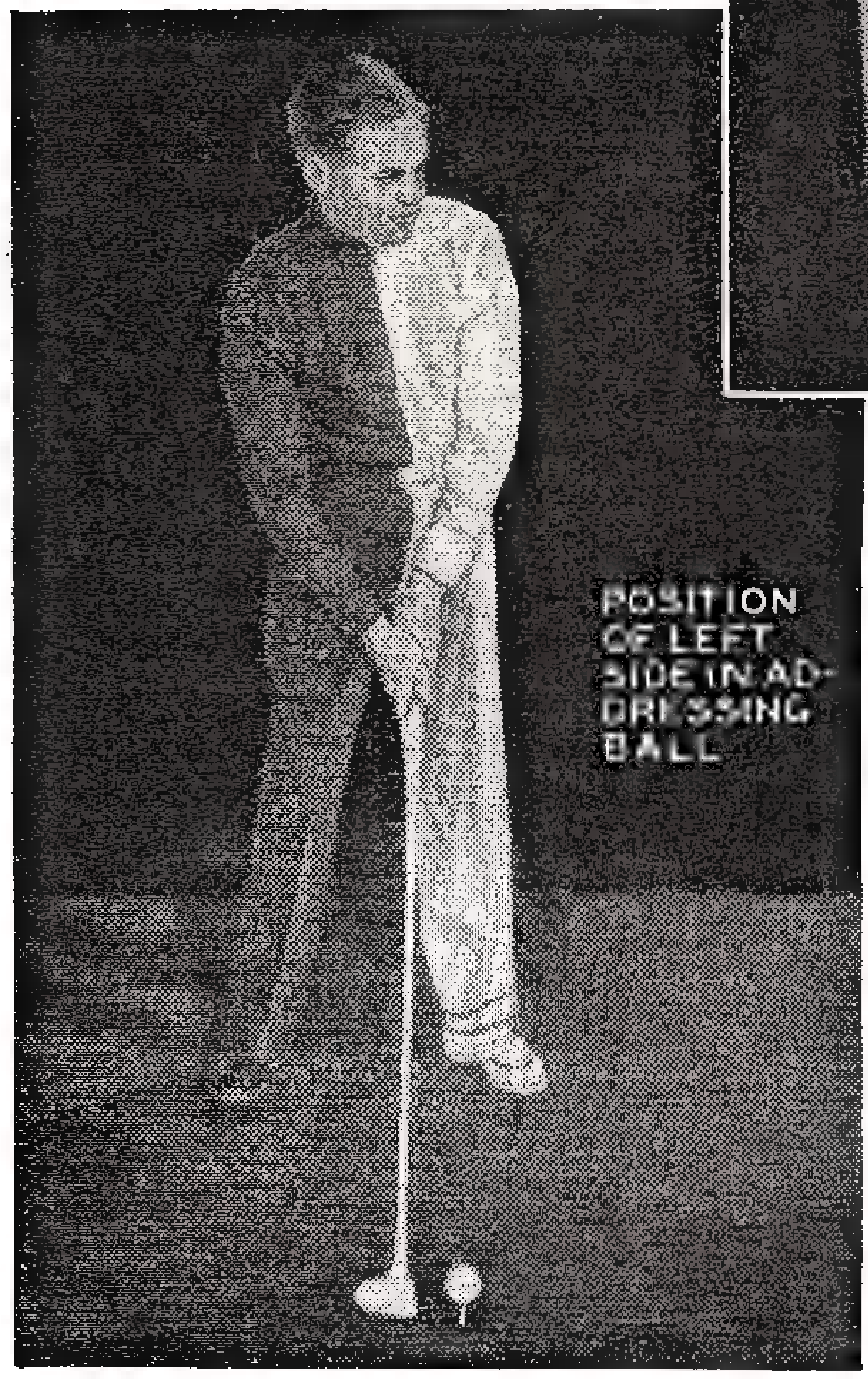


STOP MOTION AT TOP OF BACK SWING

Above—Bobby points to a stop-motion picture of himself and explains what he is doing. Left—this picture tells better than a thousand words the importance of a straight right leg to give driving power, on the familiar fulcrum and lever principle.



TOP OF SWING—NOTE POSITION OF RIGHT LEG PUTTING POWER INTO STROKE



POSITION OF LEFT SIDE IN ADDRESSING BALL

improve their game. Correct address or position as one stands to the ball is well shown in three of the pictures. Note that Bobby stays *behind* the ball where he can move into the shot as he swings through. He says it is best to avoid trying too hard to force the body into a mechanically set position, as it is likely to set up muscle-stiffening tension.

Few golfers, Bobby says, move their hips in the correct way to add force to the drive. Powerful muscles of the back and waist cannot be brought properly into action unless the hips are turned enough to enable the club to swing down to the ball from the inside. Slicing and pulling are attributed to this fault.

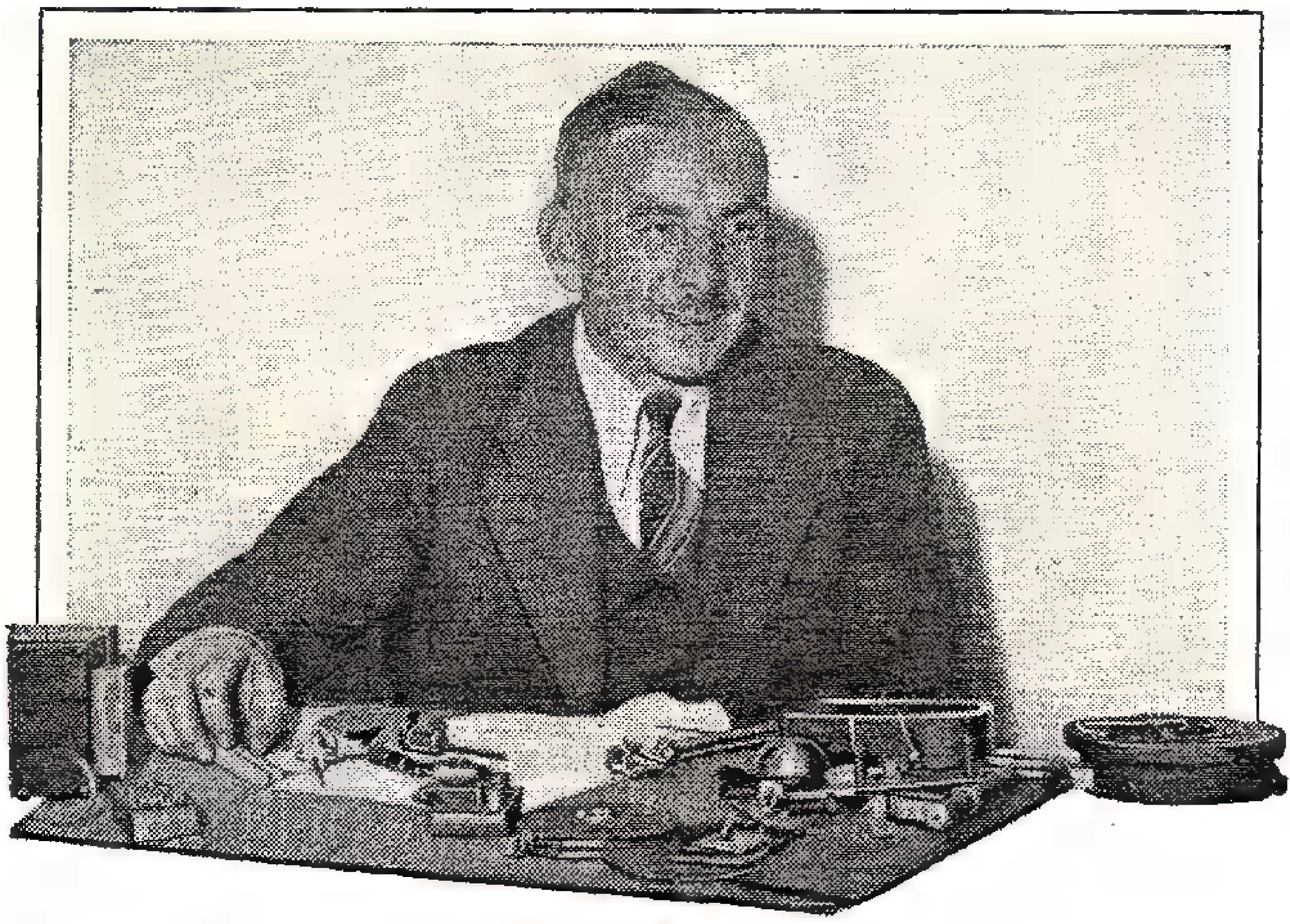
In the photo illustrating the top of swing, note how Bobby's right leg, in white, is placed to bring the powerful body muscles into play behind his stroke. The front view of the downstroke gives a tip on the important matter of handling the left hip. Bobby regards it as important that the hips should move first on the downstroke, before the arms, the left hip leading the turn back to the ball. The entire left side should be taut, from hip to hand, when the club is at the top of the back swing as illustrated.

In the actual movie, slow-motion photography is used while the sound track carries Bobby's own voice.

DEPRESSION *Spurs Lost*

by BENNETT LINCOLN

Treasure long lost under ocean waters is the golden loot which is luring half a dozen expeditions to recover it, spurred on by the urgent need for gold developing out of the present economic conditions. Charles Courtney, master locksmith who battled death to recover $60,000 from a sunken treasure ship, tells his story of high adventure in this fascinating article.



Charles Courtney, master locksmith, who recovered part of the sunken gold of the Hampshire. He tells of his adventures in this article.

GOLD, down through the ages a symbol of wealth, has now become so doubly priceless that we in this country may not even legally possess it! Beyond a doubt that is one reason why so many expeditions are at work today recovering the gold of other ages—gold which went down weeks or years or centuries ago, and since that time has been resting uselessly in the mud-filled hulks of ancient galleons.

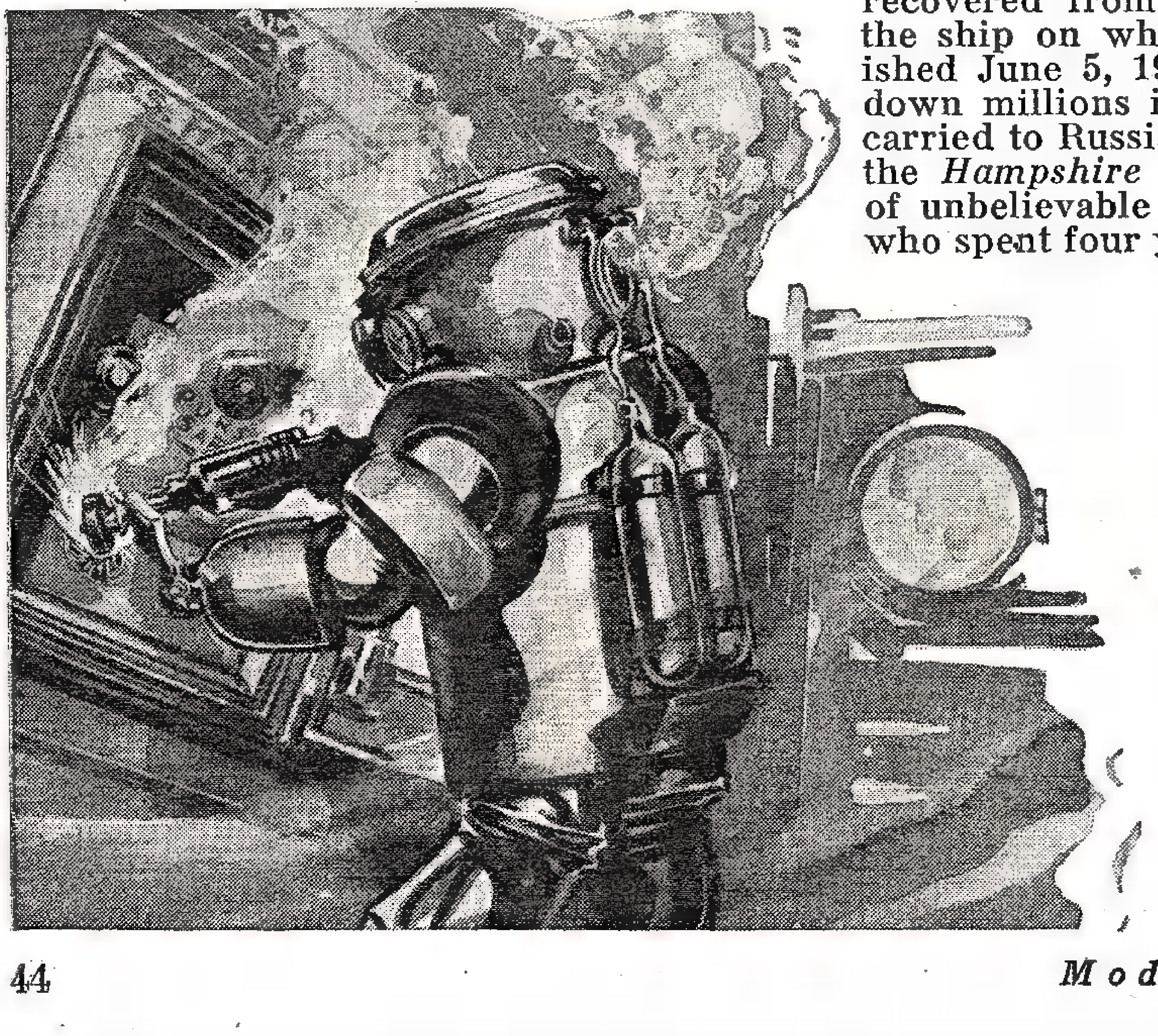
Just how many submarine treasure-hunting expeditions are at work today it is impossible to say, since many of them surround their activities with a veil of absolute secrecy. The purpose which this secrecy serves is easily understood when one realizes that the treasure lure may bring rival salvors to the scene ready to do battle for sunken loot.

A few days ago a coast guard cutter was despatched to a point 60 miles off the Virginia Capes where two rival treasure ships were threatening open conflict. The lure in this case was the sunken *Merida*, which went down 20 years ago after a collision, carrying a reputed $6,000,000 in gold.

The trawler *Theresa and Dan* and the tugboat *Salvor* were both anchored in the vicinity of the sunken ship. Each called for assistance to prevent an open clash. Eventually both ships retired and the *Merida's* gold still remains for the lucky salvor.

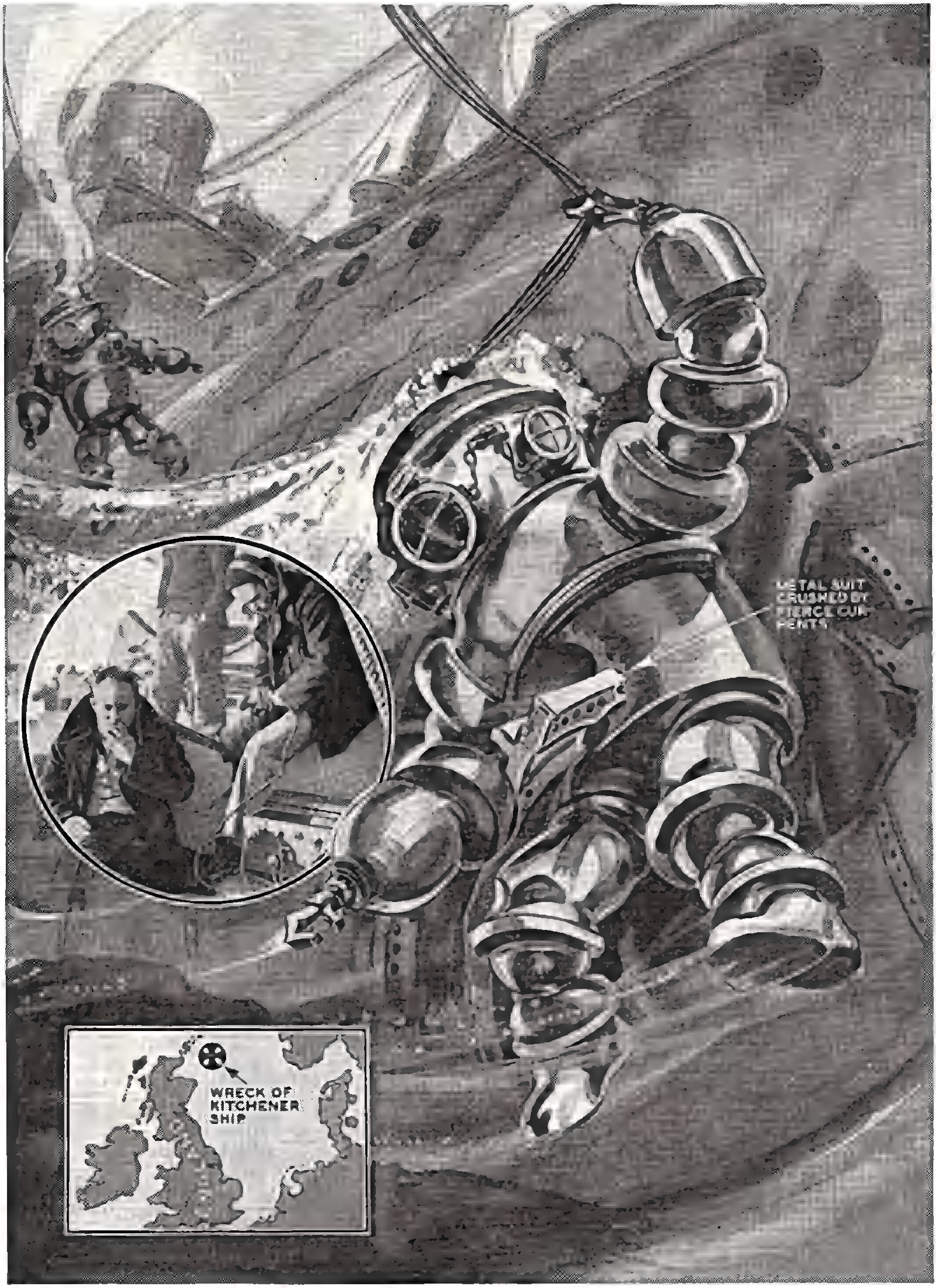
Perhaps the most striking of recent hunts for lost ships is that in which $60,000 was recovered from the sunken *Hampshire*, the ship on which Lord Kitchener perished June 5, 1916. With the boat went down millions in gold which was being carried to Russia. Just how the wreck of the *Hampshire* was located in the face of unbelievable difficulties by a "Mr. X" who spent four years tracing down a German who worked on the boat which left the mine that sank the *Hampshire*, is a story in itself.

More thrilling were the adventures of Charles Courtney, master locksmith, who personally recovered a strong box from the *Hampshire's* safe containing $60,000. Readers of MODERN MECHANIX AND INVENTIONS



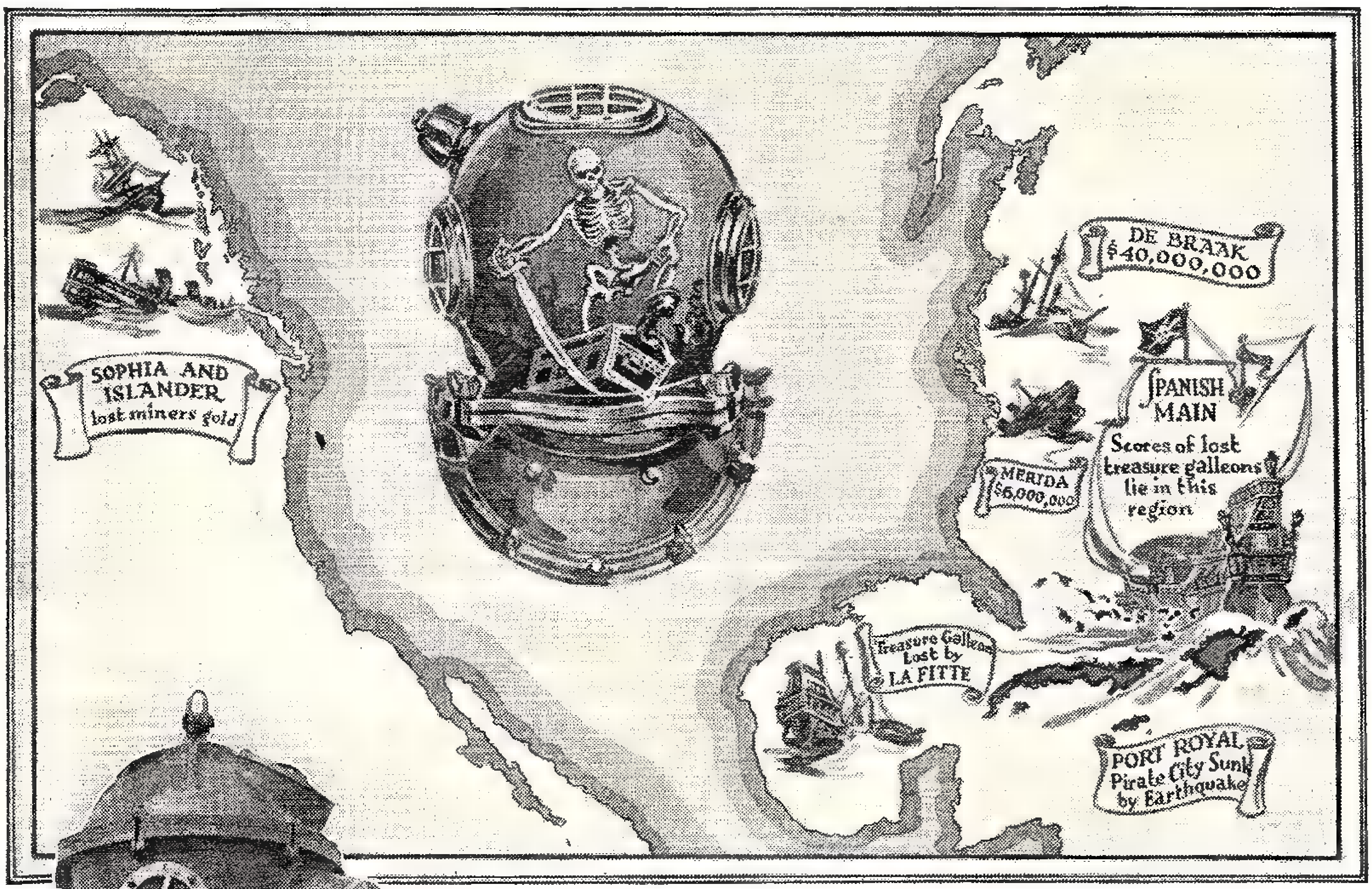
At left—Courtney bored open the sunken Hampshire safe with a grindstone drill and removed a strongbox containing $60,000 in gold. He had to work with extreme care to avoid setting off possible T.N.T. triggers within the safe.

Gold TREASURE Hunts

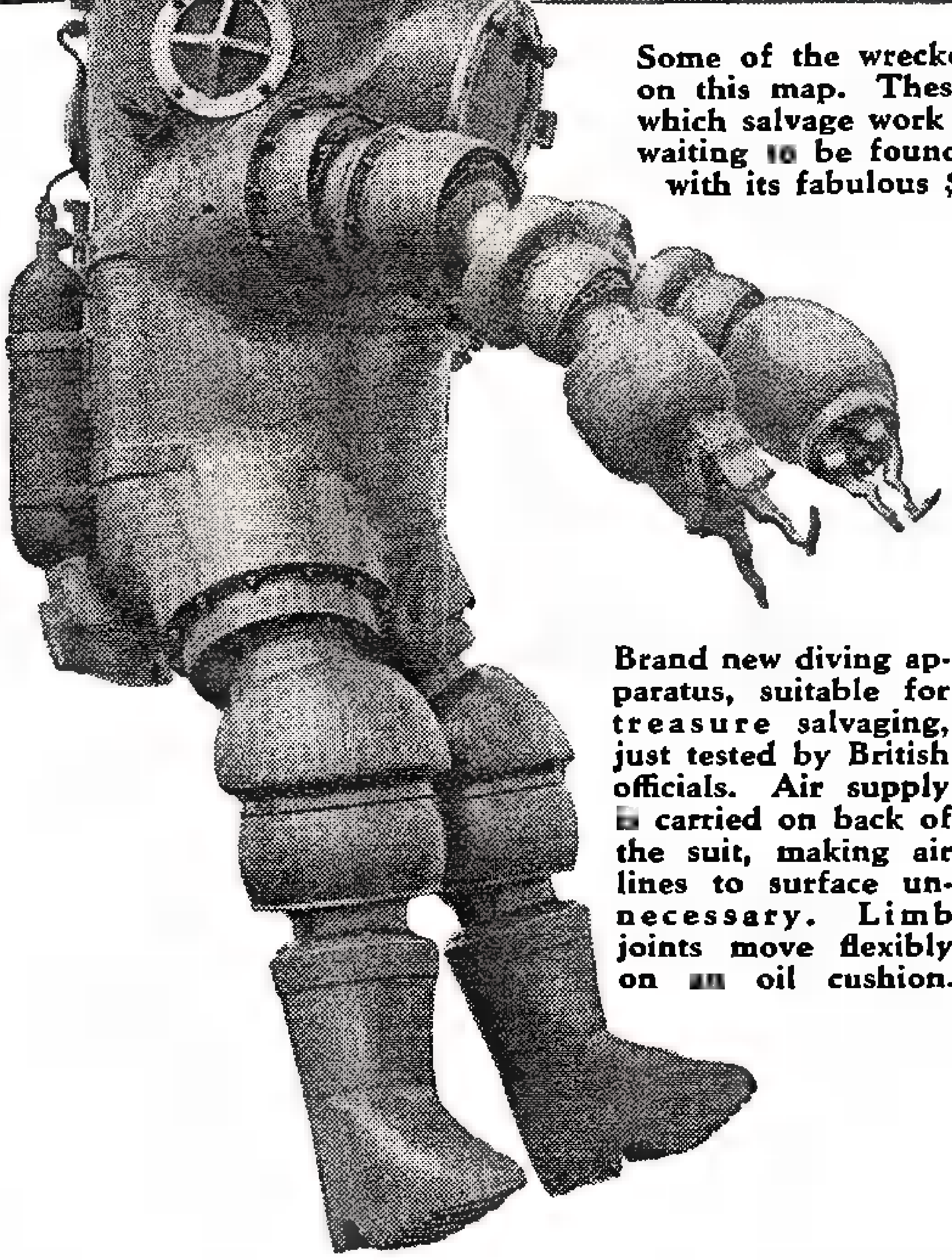

METAL SUIT CRUSHED BY FIERCE CURRENTS
WRECK OF KITCHENER SHIP

Charles Courtney's long battle with death when treacherous currents crushed him irresistibly against the bulk of the sunken treasure ship, is illustrated. In circle—how telephone communication is maintained. Map shows sunken Hampshire.

Treasure Wrecks Dot Shores of Our Continent—Many Still Unfound


SOPHIA AND ISLANDER lost miners gold
DE BRAAK $40,000,000
SPANISH MAIN Scores of lost treasure galleons lie in this region
MERIDA $6,000,000
Treasure Galleon Lost by LA FITTE
PORT ROYAL Pirate City Sunk by Earthquake

Some of the wrecked treasure ships of the American continent are pointed out on this map. These are only those which have been definitely located and on which salvage work has been done. Scores of others lie in spots as yet unknown, waiting to be found through old records—just as the location of the De Braak with its fabulous $40,000,000 in gold was recently discovered after long search.



Brand new diving apparatus, suitable for treasure salvaging, just tested by British officials. Air supply is carried on back of the suit, making air lines to surface unnecessary. Limb joints move flexibly on an oil cushion.

will remember Mr. Courtney's own story of his methods of opening the safe on the sunken *Egypt* in an eminently successful salvage venture which up to date has recovered $3,250,000.

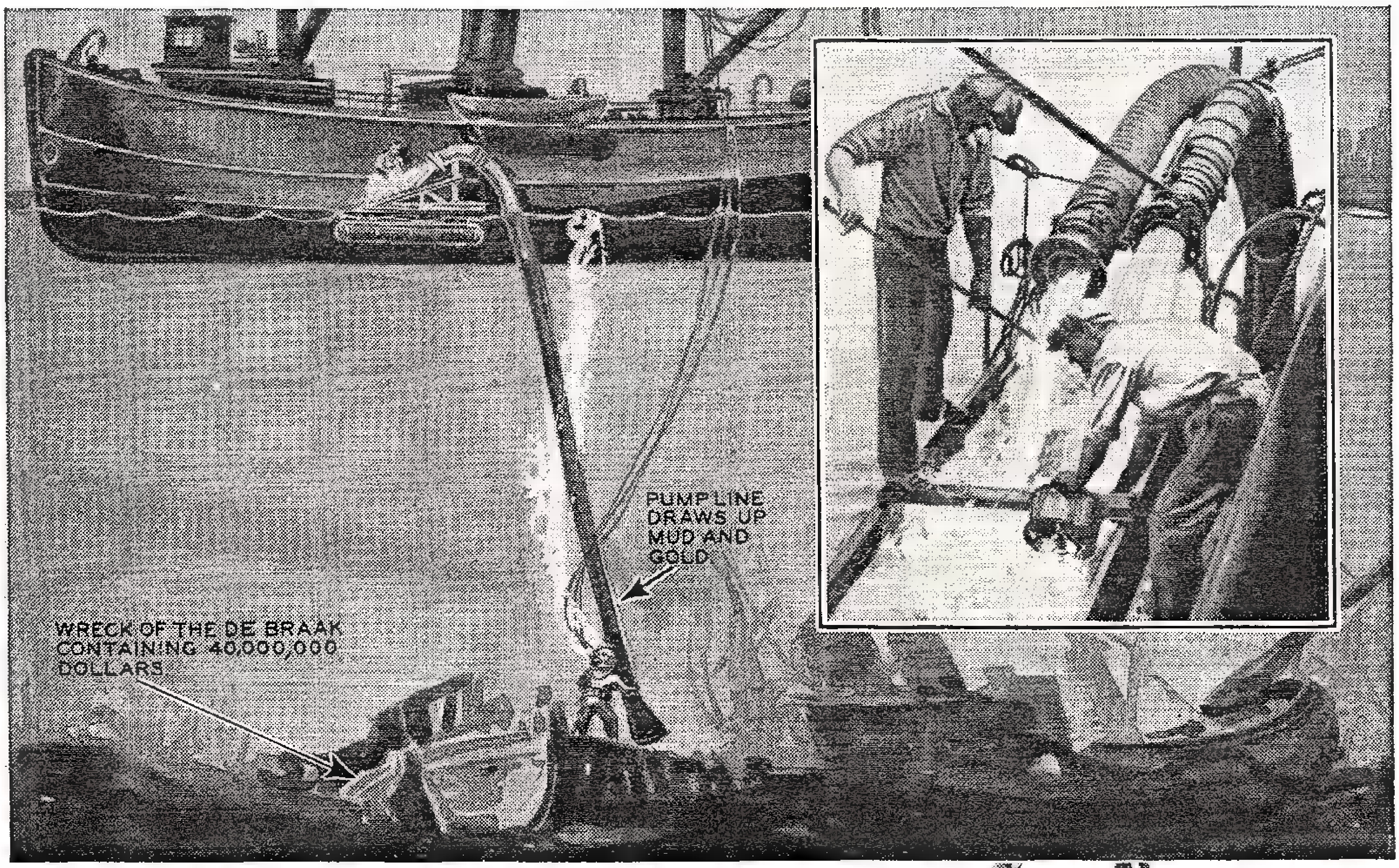
Mr. Courtney is president of the American Association of Master Locksmiths, and so widespread is his fame that when a man was needed to unlock the safes of the *Hampshire,* Mr. X came from the other side of the sea to seek his services. Courtney accepted the commission, veiled in secrecy, little knowing that before he had completed his contract he would very nearly have paid with his life, and that he would carry a shattered wrist and hair prematurely whitened by terror as a permanent reminder of a disastrous bout with death.

Sitting in his New York office, the master locksmith told me the terrifying story of his experiences for readers of this magazine. He told me of being taken aboard the salvage ship, of a zig-zag course taken to the treasure site to elude possible pursuers, of the location of the wreck—and finally of his own part in the drama.

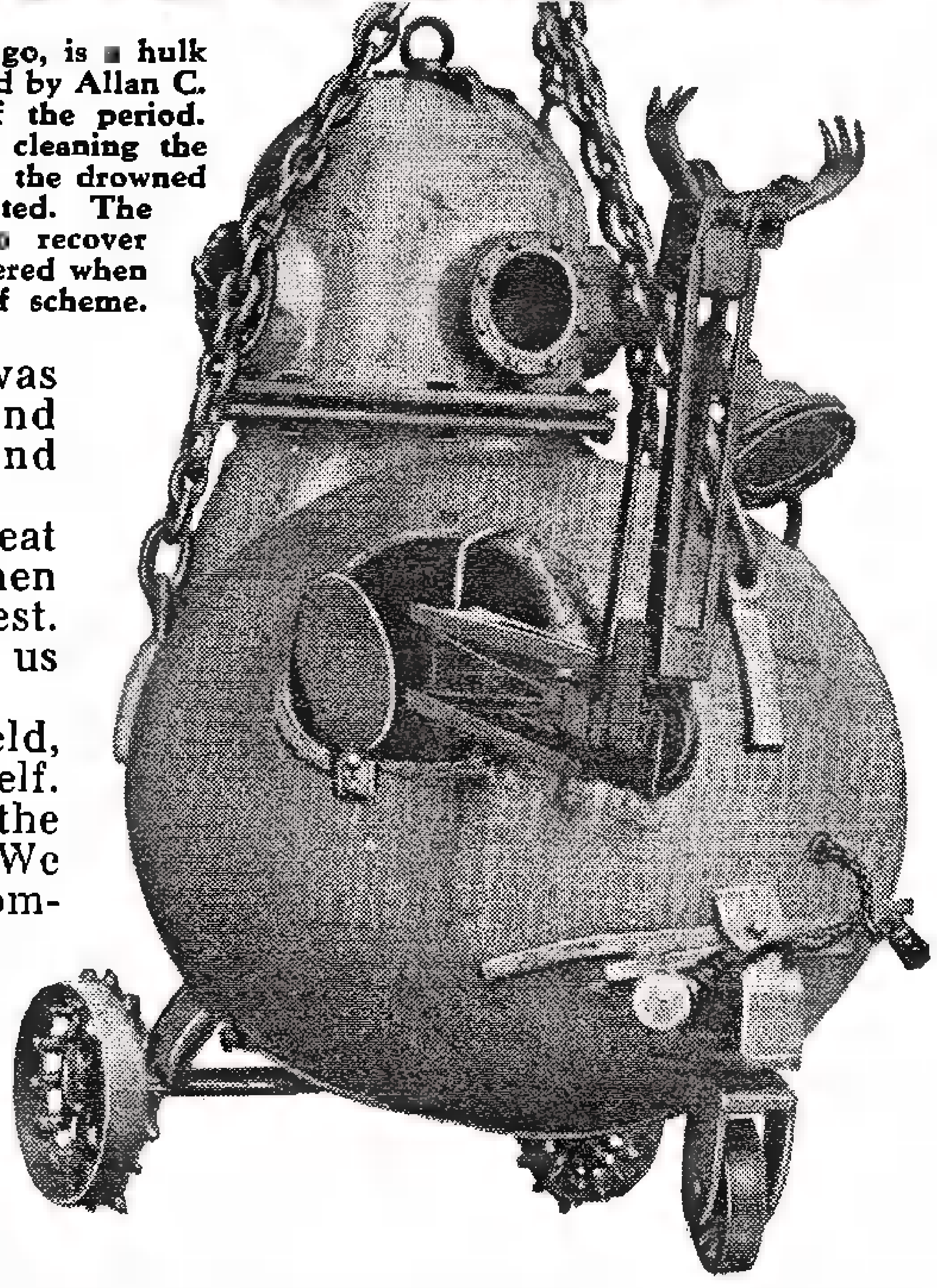
"Right after the ship was identified, I started my diving work. I went down and with the use of a grindstone drill succeeded in boring open a built-in safe in the ship. That was a mighty difficult job, cracking that safe. I had to guard against T-N-T triggers or other safeguards which its makers might have secreted in it. I blew it open without mishap, however, and withdrew from it a strong box which I later discovered contained about $60,000 in gold.

"I went down once again after recovering that strong box with the $60,000. You see there was no possible way of opening those safes without my presence down there. It was impossible to calculate the nature of the tumblers because of the havoc

Long Lost De Braak, Carrying $40,000,000, Found After Long Search


PUMP LINE DRAWS UP MUD AND GOLD
WRECK OF THE DE BRAAK CONTAINING 40,000,000 DOLLARS

The De Braak, sunk off Cape Henlopen, Delaware, decades ago, is a hulk reputed to contain $40,000,000 in gold. It has just been located by Allan C. Robertson after a long, romantic search through records of the period. Salvaging will be done by pumplines, sucking up mud and cleaning the "bones" of the hulk to make it easy for divers to lay hands on the drowned gold. Inset photo shows the powerful pumplines being tested. The photo at right shows weird machine used by syndicate to recover gold from the Islander, sunk off Alaska. Some gold was recovered when dissension among members forced temporary abandonment of scheme.



of time. The only method we could employ was to locate the safes and figure out the best and most harmless way of blasting them open, and still regain the treasures they held.

"By April 24 there had already been a great deal of blasting work. This was the day when we were to reap our hard-fought for harvest. There was $10,000,000 lying there waiting for us to bring it back to civilization.

"Down we went, Costello, Samuel Mansfield, an adventurous youth from Virginia, and myself. We were in our aluminum suits. We had the customary equipment and auxiliary devices. We used our telephones constantly, keeping in communication with the engineers on deck of the salvage boat. As my two companions and myself were let down on the second descent the first 100-foot drop was without a hitch. At 200 feet I was suddenly seized with misgivings. Something was wrong.

"I was cut off from communication with my other two comrades. Fear of darkness overcame me—darkness as smothering, as all-enveloping as the inside of a coffin.

" 'Bring us up quick! We've been struck by an undertow!' I yelled desperately.

"But no response. No signal or other token that those on the surface got my S O S. Having had experience as a diver I tried to be calm. I figured, or tried to figure as calmly as I could, that those above were waiting for the current to ease. I could not budge the cables. The electricity was cut off so that there could not be a short circuit.

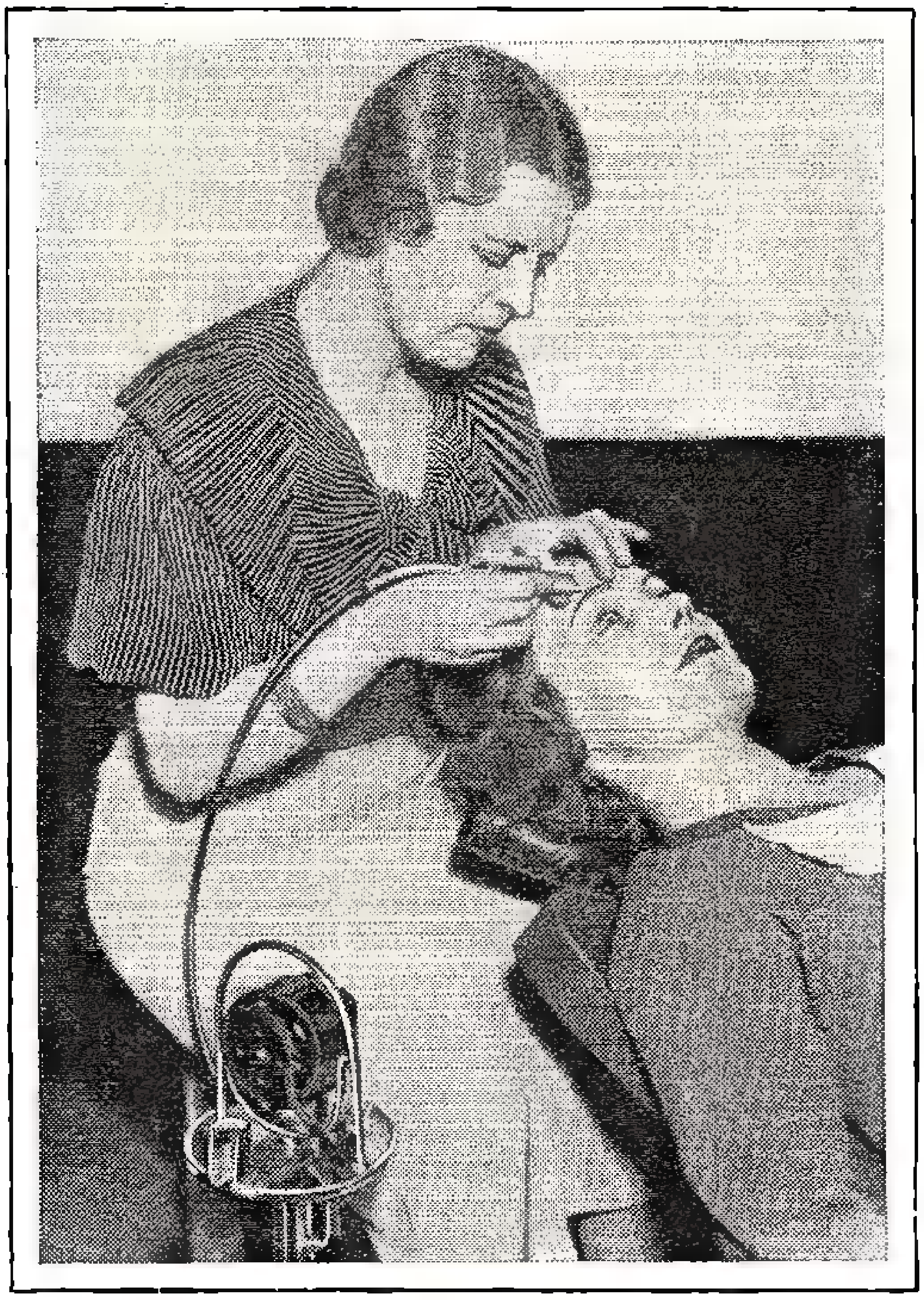
"In another moment I was seized with a terrifying sensation. As I dangled there helplessly, hoping and praying for rescue, my suit was cut in the right side. I was flung violently against the side of the *Hamp-*

(Continued on page 8)

Motorized Eyebrow Tweezer Works Rapidly, Painlessly

THE painful yanking of eyebrows with tweezers in order to obtain the high-arched brow, the fashion now prevailing among the feminine sex, is a thing of the past, thanks to the development of the machine shown in the photo at the left.

The instrument, inventors claim, not only pulls the hair out by the roots, but also does the job in a painless and permanent manner. Power is furnished by a small motor through a flexible cable, to the end of which is attached a hair-extracting device of special design.



Eyebrows are given that fashionable high arch with a minimum of pain to the vain one with this new motor driven tweezer. The specially designed puller on the end of the flexible shaft from the motor extracts hairs painlessly.

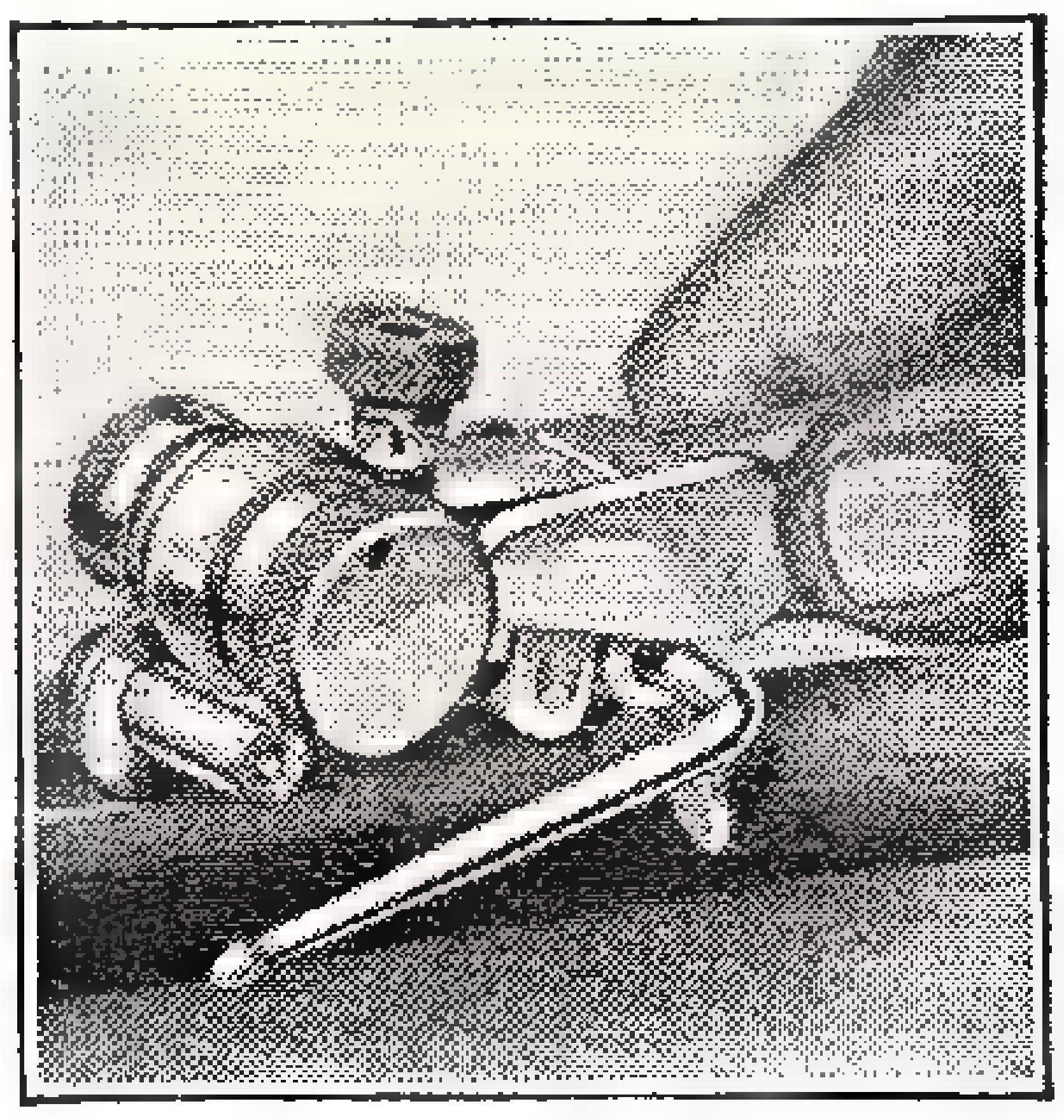
Wire Breaks Cast Without Pain

THE torture of removing a plaster cast from a patient's leg is greatly reduced by the use of a new method devised by surgeons.

When the cast is first shaped around the injured limb, a wire is embedded in the plaster, the ends protruding at top and bottom. When the cast is to be taken off, the medicos run the wire through a slot in a rectangular board, and then twist it around a key. When this key is turned in the same manner that you turn a key on a sardine can, the wire is ripped from the cast, thus breaking it apart.

Cast is broken apart for painless removal of limb by turning the keys which wind up the wire embedded in the material forming the cast. Hammering and chiseling is eliminated.

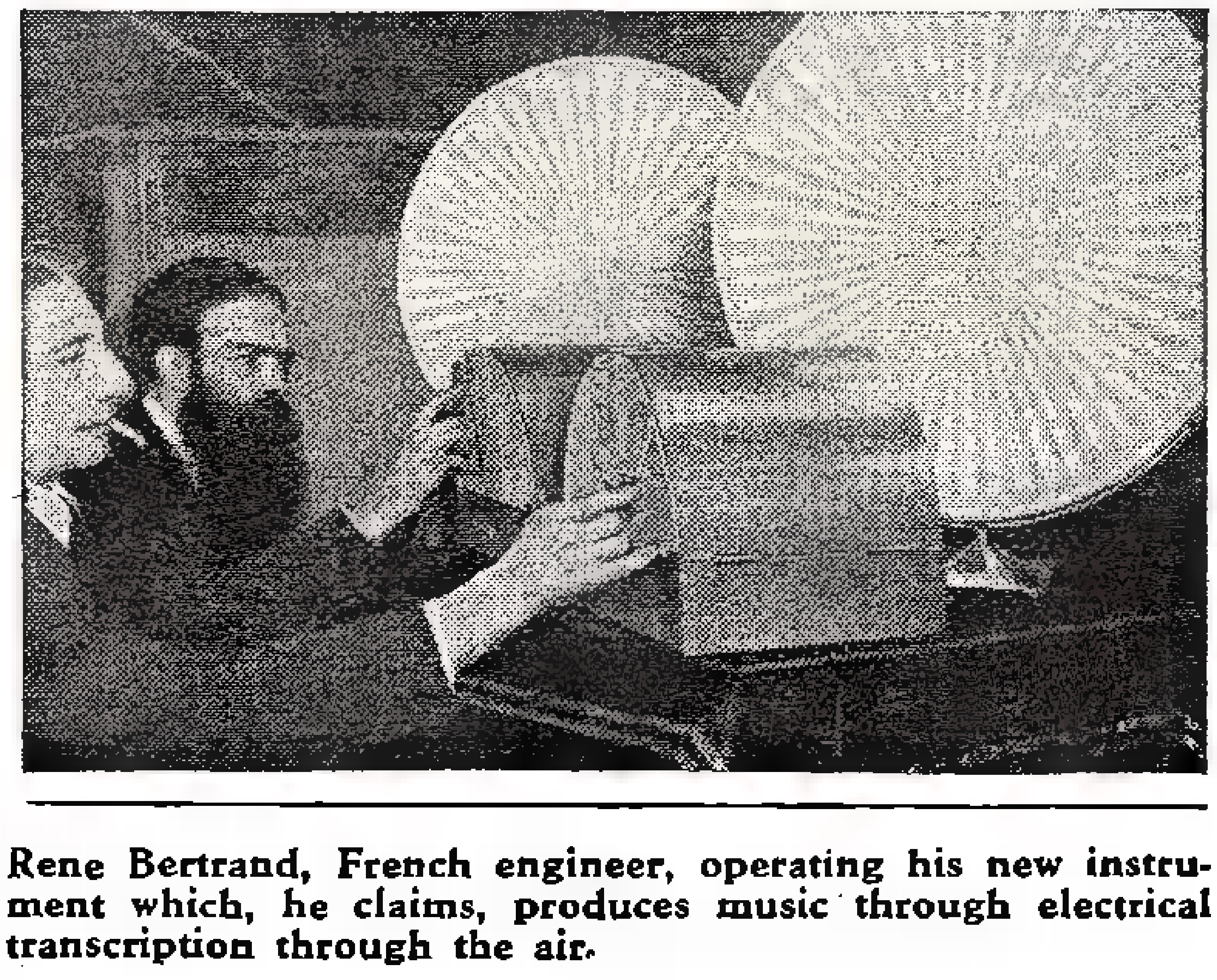
Wheel Lays Perfect Paint Stripe



Pressing trigger starts the stripes.

THIS automatic striper for autos, furniture, toys, etc., is said to lay a perfect stripe by means of a revolving wheel. A slight pressure on the thumb trigger releases the wheel and the paint is applied by its rim which passes in and out of a color chamber. With this tool any tyro can now do a perfect job of striping.

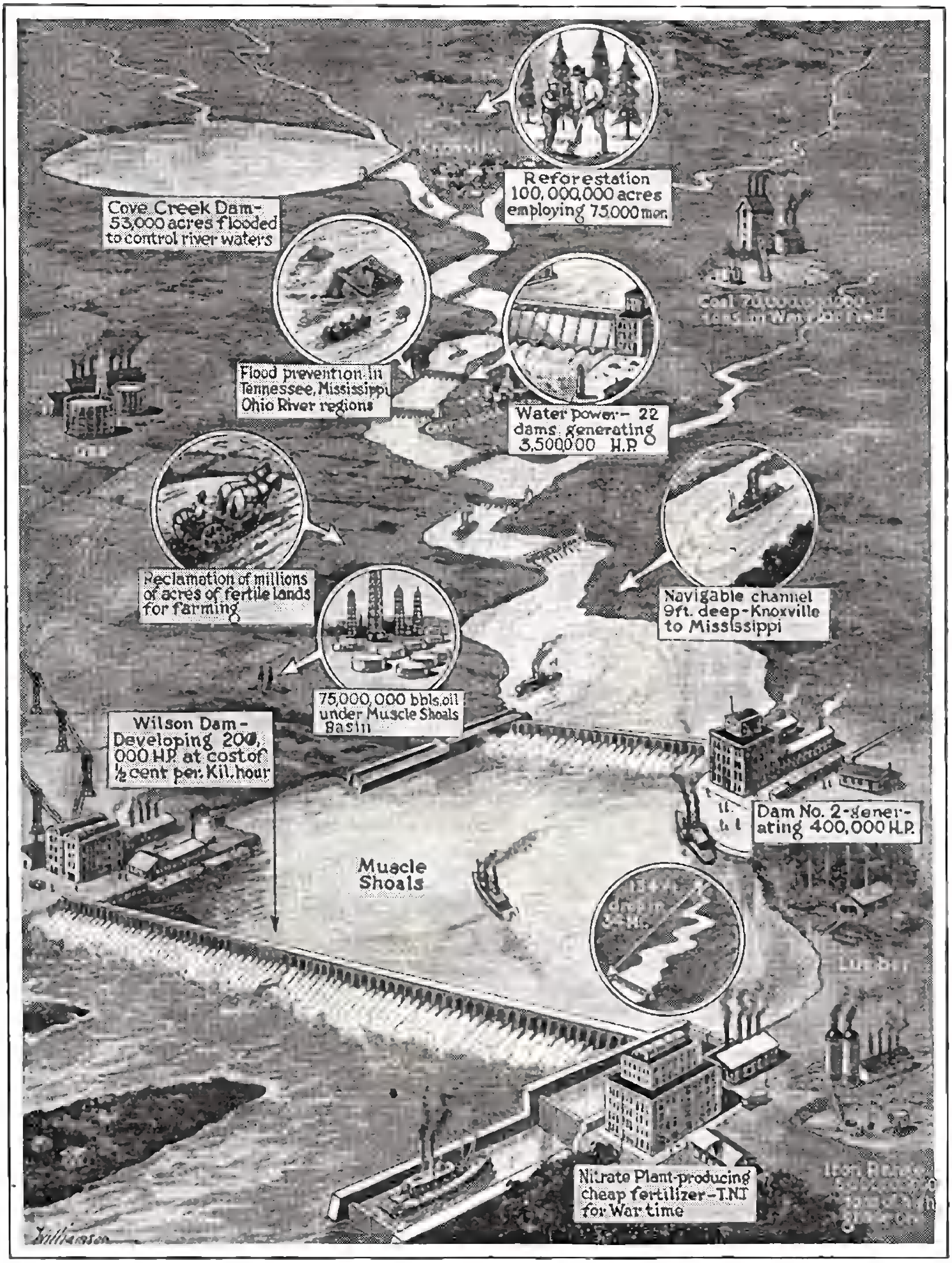
Odd Device Makes Music From Air



Rene Bertrand, French engineer, operating his new instrument which, he claims, produces music through electrical transcription through the air.

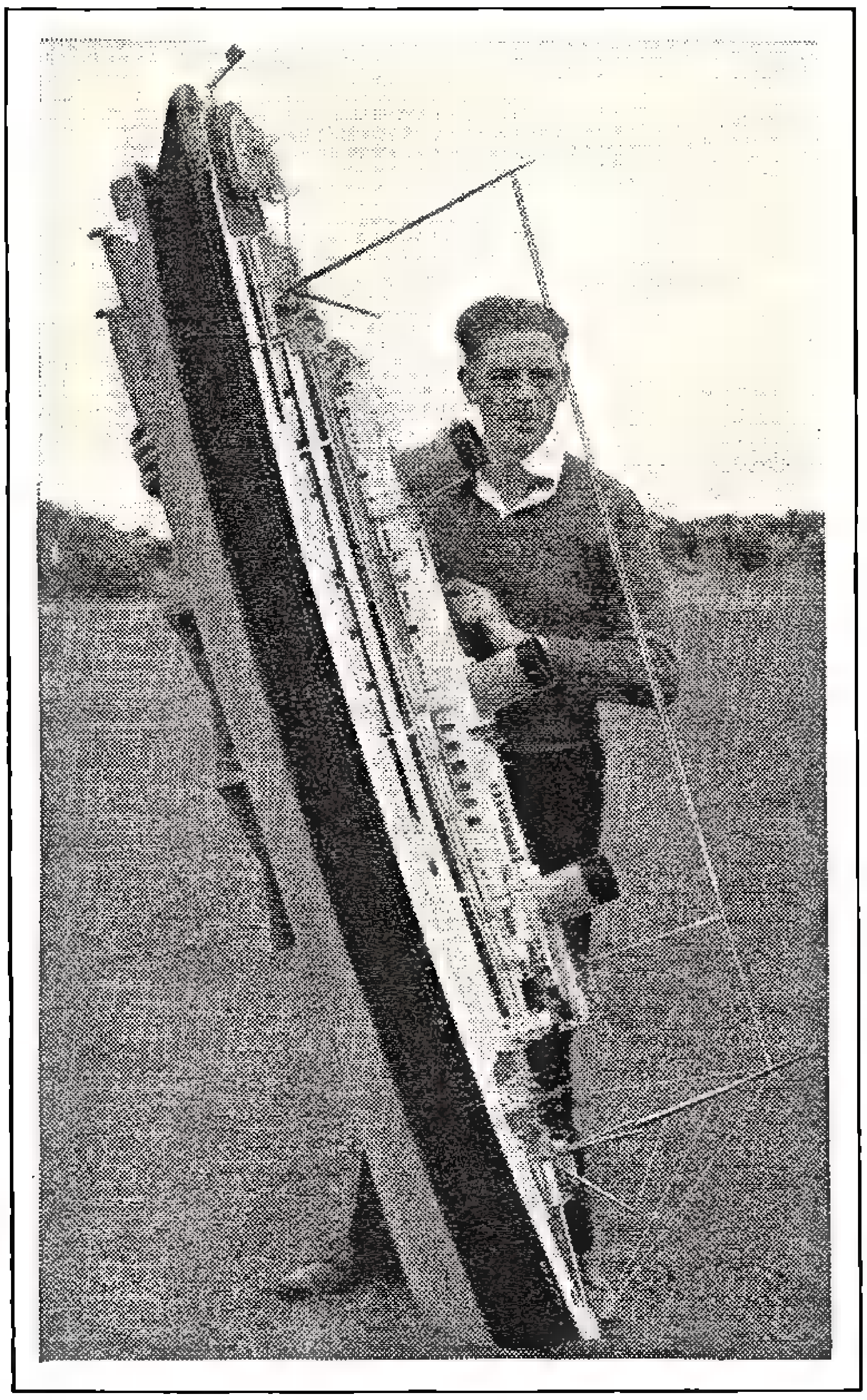
A FRENCH engineer, Rene Bertrand, has developed an instrument which, he claims, will produce music through electrical transcription from the air. How the apparatus operates has not been divulged by the promoters, save for the information that it is far superior to the instrument devised by the Russian scientist, Prof. Theramin. Tone and volume of the music is controlled by the dials on the two cabinets, while the sounds issue from the two large speakers.

Tennessee Project to Help Whip Depression


Cove Creek Dam-
53,000 acres flooded
to control river waters
Reforestation
100,000,000 acres
employing 75,000 men
Flood prevention in
Tennessee, Mississippi
Ohio River regions
Water power- 22
dams generating
3,500,000 H.P.
Reclamation of millions
of acres of fertile lands
for farming
Navigable channel
9ft. deep-Knoxville
to Mississippi
75,000,000 bbls. oil
under Muscle Shoals
Basin
Wilson Dam-
Developing 200,
000 H.P. at cost of
½ cent per Kil. hour
Muscle
Shoals
Dam No. 2-gener-
ating 400,000 H.P.
Lumber
Nitrate Plant-producing
cheap fertilizer-T.N.T.
for War time
Williamson

Here is picturized one of the most astounding projects yet advanced to whip the depression—the industrial development of the Tennessee River valley, site of the famous Muscle Shoals dam. The plan, still controversial in many of its aspects, is here visualized in picture form. Recently brought to national prominence by President Roosevelt, the plans call for the expenditure of a billion dollars and the employment of 200,000 men. Twenty-two gigantic dams would be built along the river to generate 4,000,000 h.p. for cheap distribution to Midwest cities. A 9-foot channel would be dredged from Knoxville to the Mississippi. Huge nitrate factories at Muscle Shoals would turn out fertilizer for farmers, high explosives in wartime. Criticism of the plan revolves around its economic aspects, some authorities being doubtful that the huge cash outlay would ever be returned by operations.

Model Masterpiece Built From Tin Cans, Old Clocks, Etc.



Harry Windsor, of Inglewood, Calif., with his model of the S. S. Majestic, which he built. Pronounced a masterpiece by experts, the vessel has all machinery of its big sister.

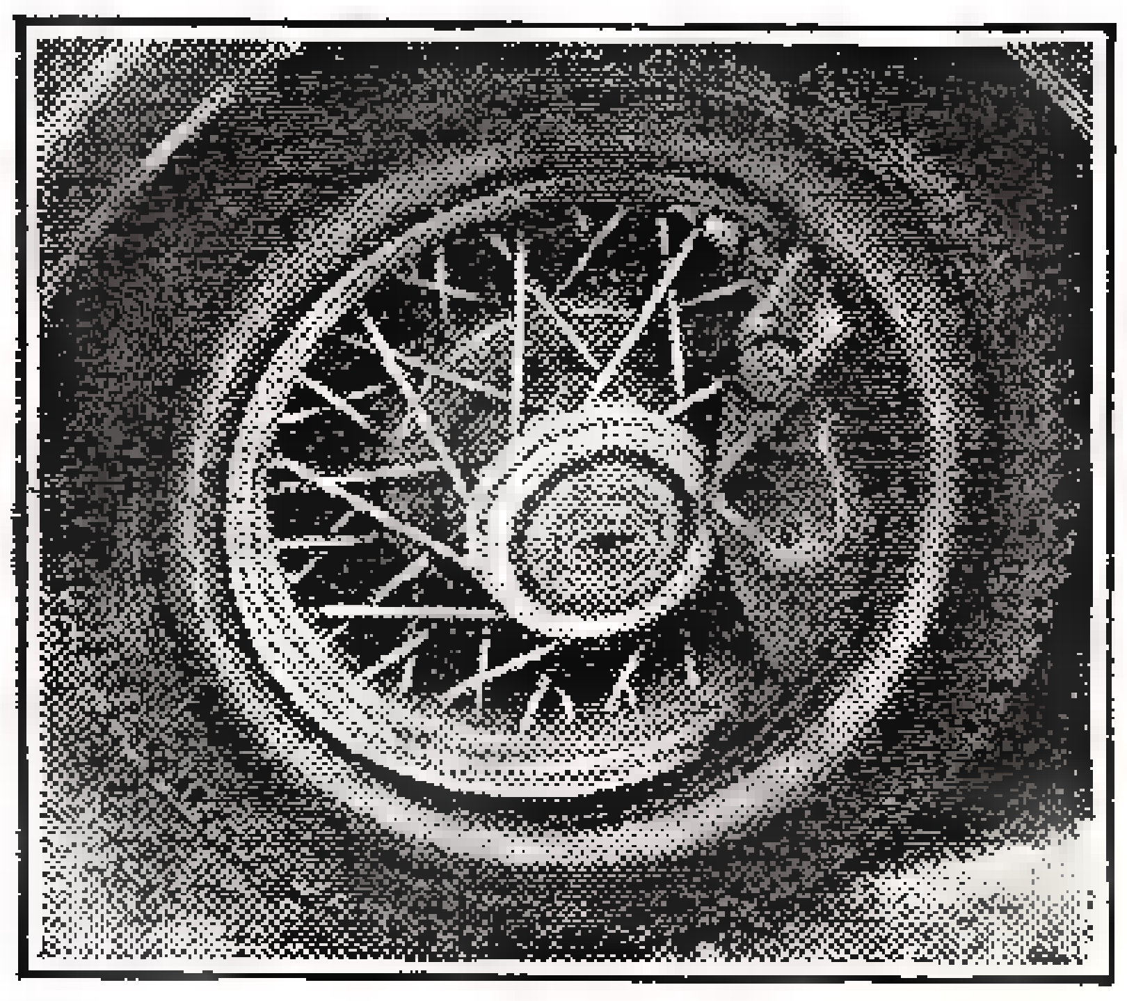
WHAT an expert modelmaker can do when he puts his heart and soul into the job is seen in the photo at the left. It's the *S. S. Majestic* in miniature. Said by experts to be one of the finest jobs of its kind, the model was built chiefly from pop corn cans, shoe eyelets, parts of old alarm clocks, piano wire, pins and similar odds and ends.

The hull is of metal and veneer. Within is machinery to operate anchors, booms, windows, screws, and lifeboat launching devices. Length of the remarkable vessel is 7 feet, height 2 feet, beam 12 inches. Eleven months of delicate and tedious work went into construction of the ship.

Easiest Way to Fix a Puncture

RELATIVELY few of the millions of drivers of small cars with drop center rims are aware that it is easier to repair a puncture without removing the casing entirely from the rim than to sweat and swear through the usual routine of taking off the casing.

After you have jacked up the car locate the source of the puncture, then pull out the offending tack or nail and mark the location on the casing, as demonstrated in the accompanying photo. With tire tool and screw driver pull off the outer bead of the casing just sufficiently to permit the inner tube to be grasped with the fingers or a pair of pliers. Pull out the tube, put on the patch, reinsert the tube and inflate.



Pull off outer bead of casing, take out inner tube to repair.

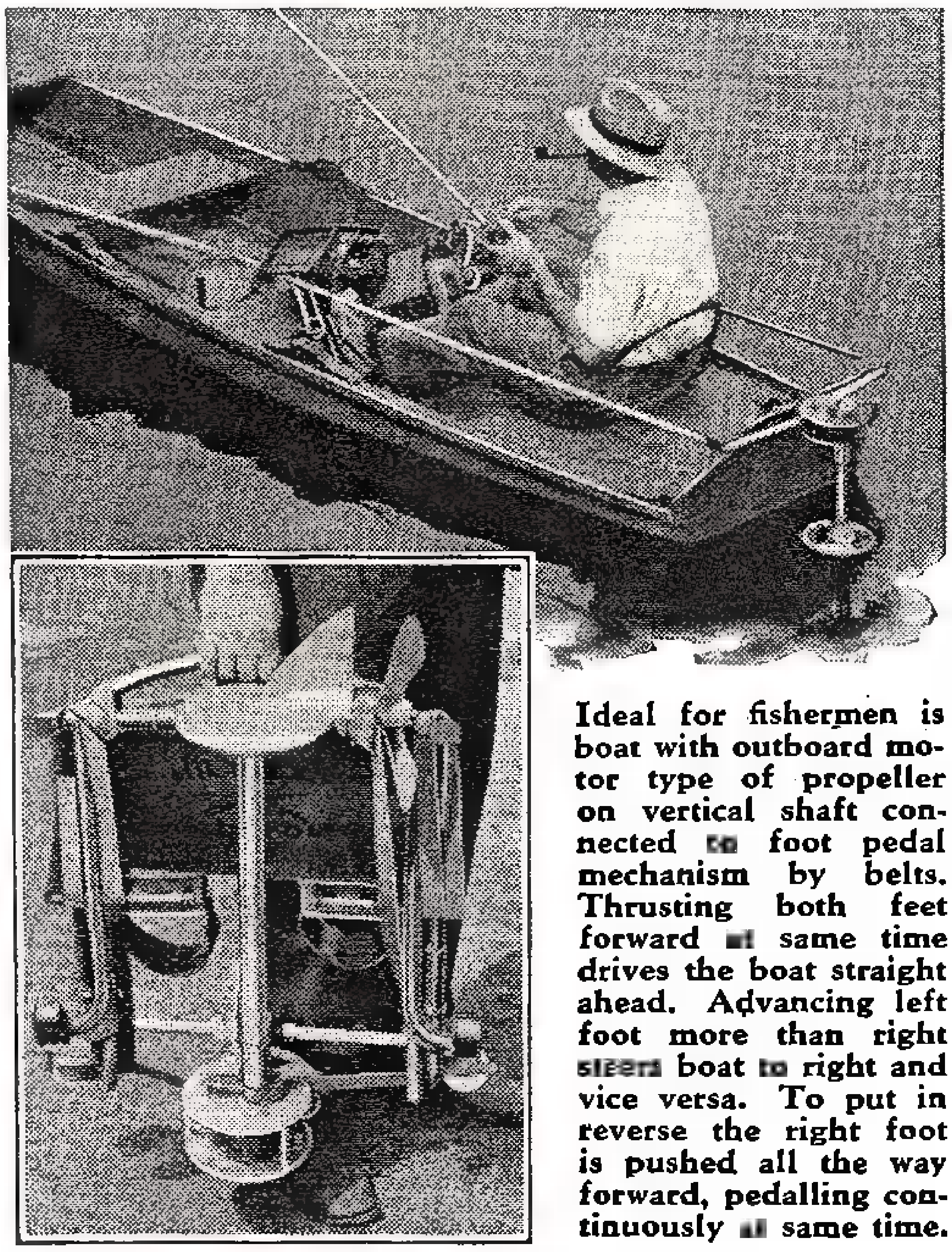
And it's all done so easily that you will adopt this stunt as the most handy of all.

Foot-powered Outboard for Fishing

WITH an ingenious foot-operated device for propelling a boat through the water, the hands are left free to fish, shoot, or what not. Generally stated the device consists of a regular outboard motor type of propeller on a vertical shaft connected to the foot pedal mechanism by belts, and a canvas-back seat in which the operator sits.

The belt runs in rollers at the top of the shaft and, traveling around the sides of the boat, it connects with two foot pedals equipped with heel sockets.

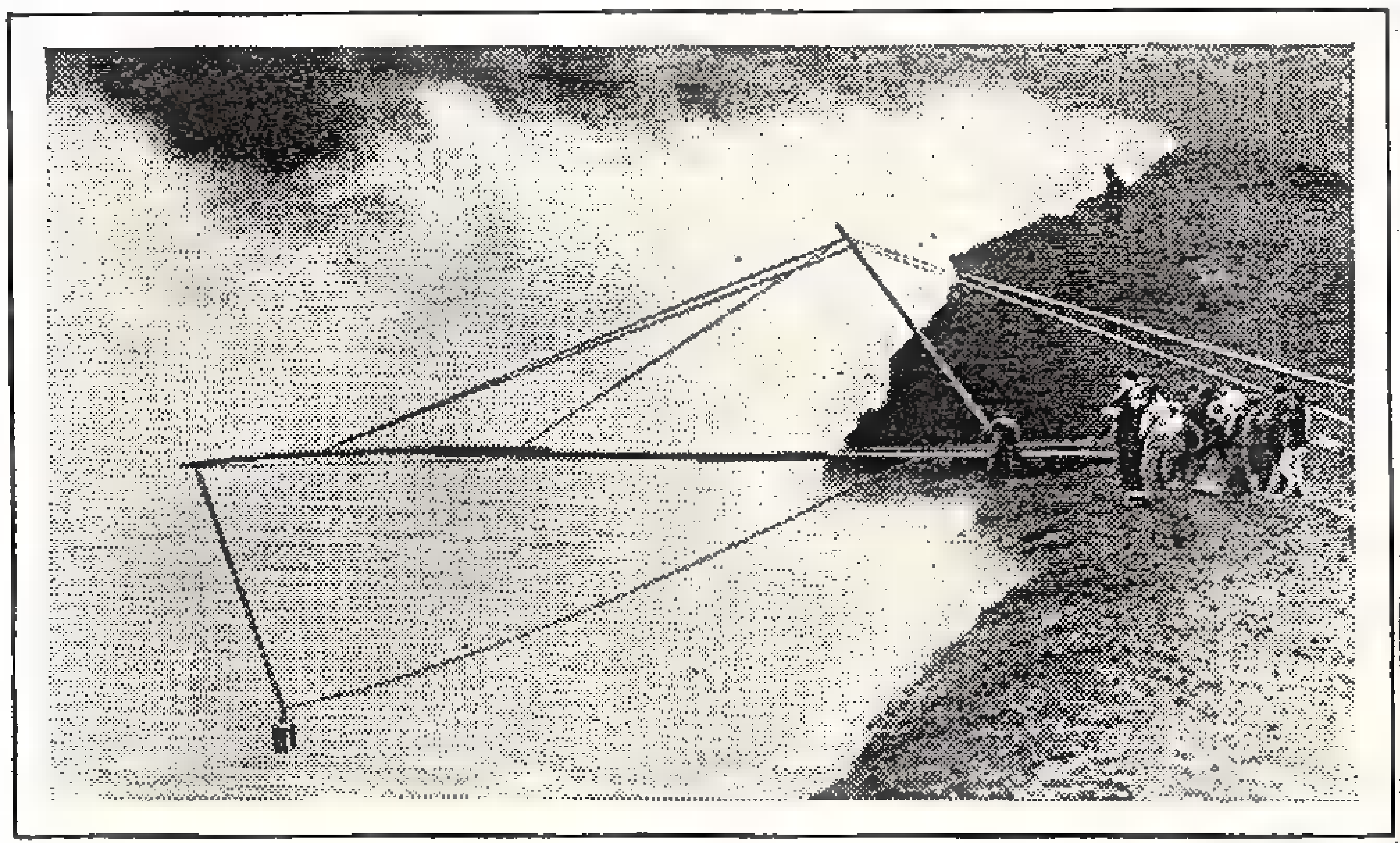
This device cannot drive a boat as fast as an outboard motor but it has ordinary rowing beat a hundred ways. It folds, seat and all, into a 29-pound package for transporting.



Ideal for fishermen is boat with outboard motor type of propeller on vertical shaft connected to foot pedal mechanism by belts. Thrusting both feet forward at same time drives the boat straight ahead. Advancing left foot more than right steers boat to right and vice versa. To put in reverse the right foot is pushed all the way forward, pedalling continuously at same time.

Braving the INFERNO *of a* VOLCANO

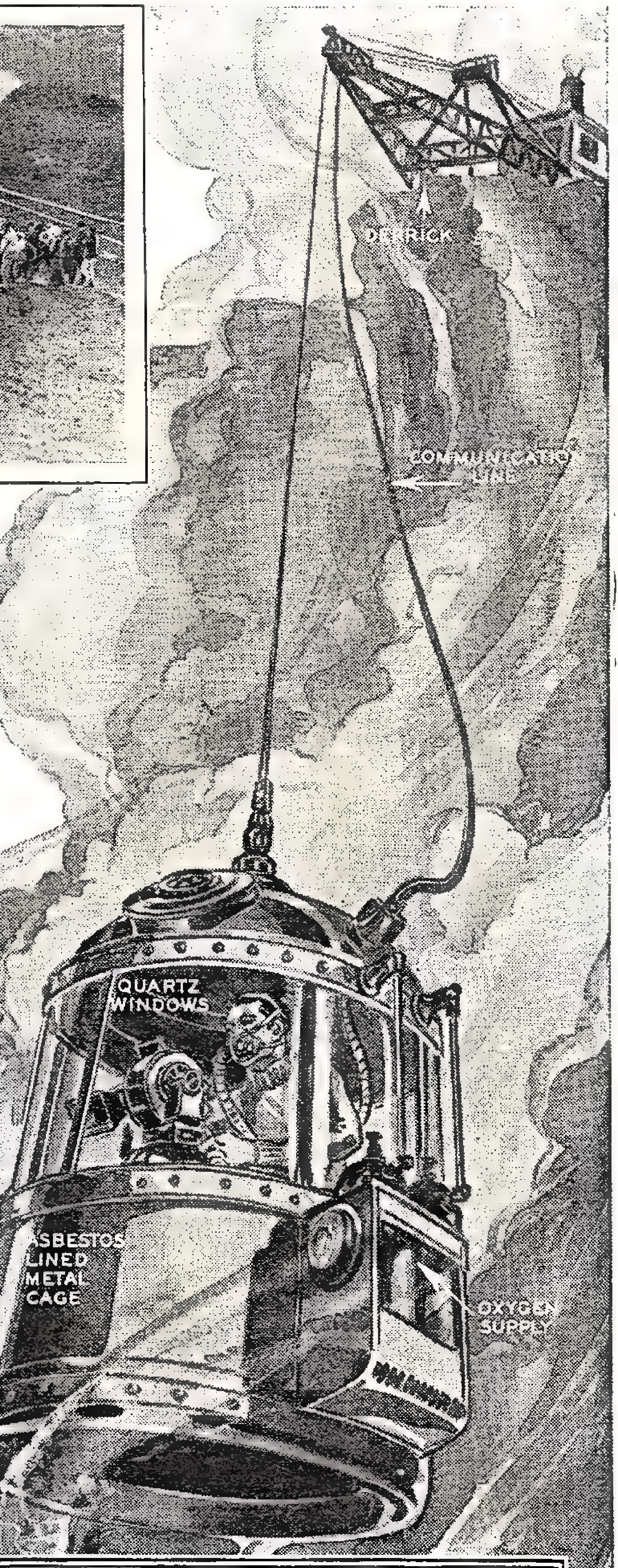
Amazing plan to descend flaming crater hanging in cage from a derrick!



Above photo shows scientists lowering a crate of guinea pigs into volcano near Tokio to test deadliness of fumes.

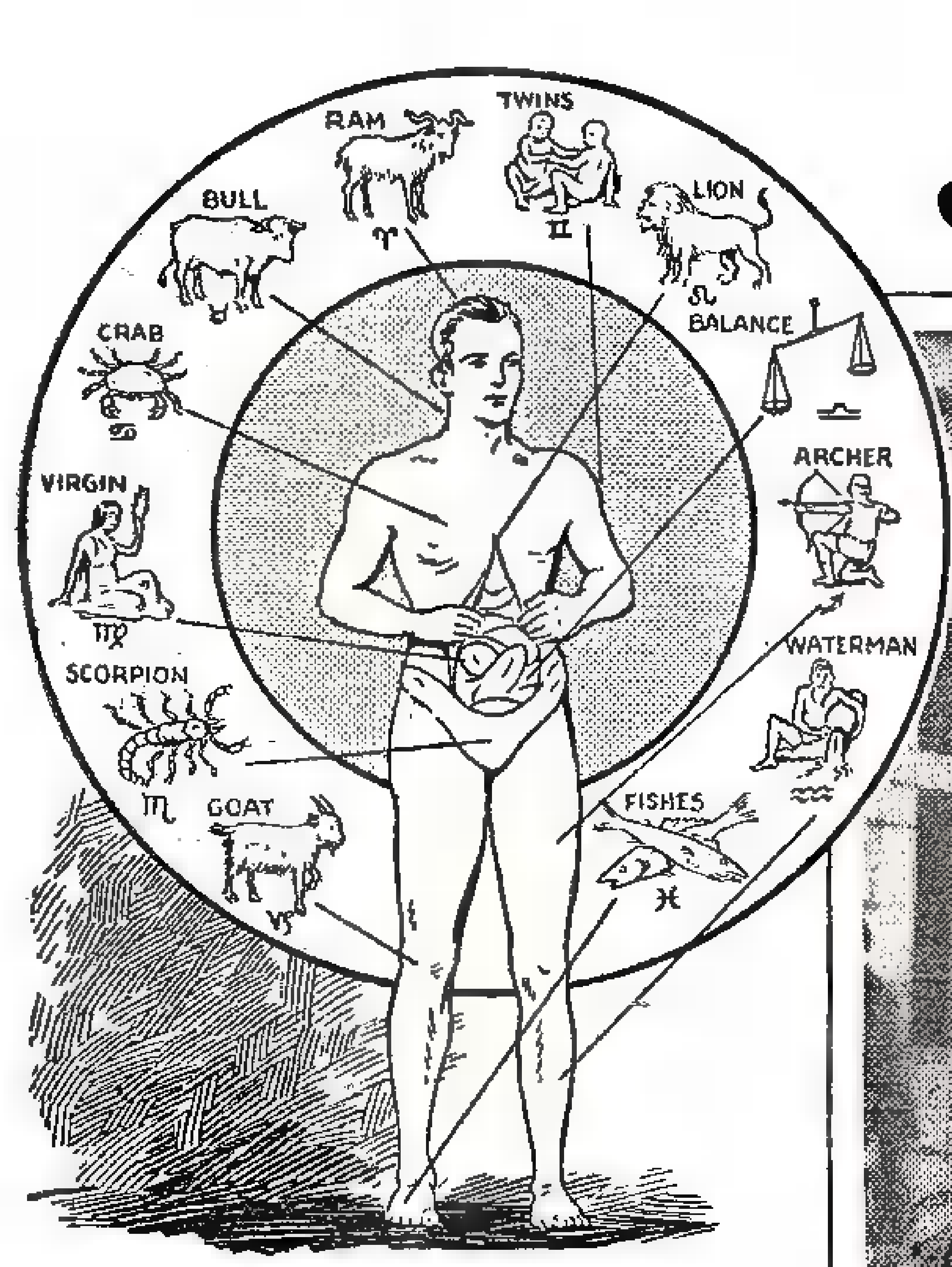
LOWERED to a depth of a thousand feet in the boiling, fume-filled crater of Mt. Mihara, near Tokio, Japan, scientists who are now carrying out an amazing program of volcanic investigations will hang in a tiny metal cage over a bubbling flood of molten lava, suspended only by a thin steel cable. Details of the device are given in the accompanying drawing. A live monkey, guinea pigs and rabbits were used in testing the toxicity of the volcano's gases. Mt. Mikara is a favorite spot for suicides, 50 people having leaped to their death since January first.

In circle—this monkey was lowered into crater to test effect of fumes on man. Although overcome when removed, as shown in picture, he speedily recovered and scientists decided that with proper protection men could descend into the crater with impunity.



In a cage of metal lined with asbestos, with quartz windows which resist heat, scientists will make observations inside the crater of Mt. Mihara, near Tokio, Japan. A derrick will be used to raise and lower the cage. A supply of oxygen is carried in containers, enabling the man in the cage to stay down for long periods. Communication with the derrick operator is maintained by telephone.

Secrets of Cures by

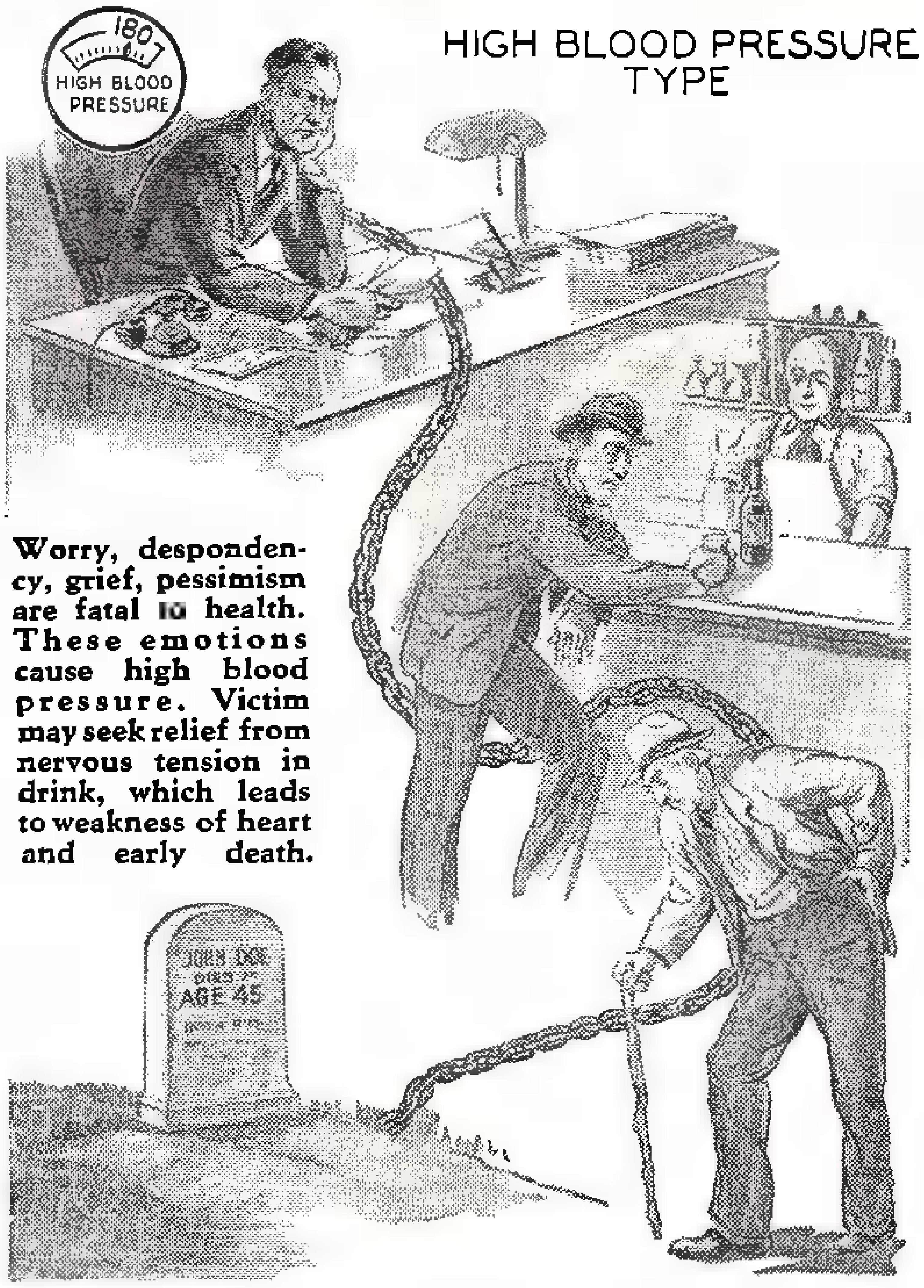


The ancients believed that the stars determined the course of human affairs. Astrologers consulted the zodiac, shown above, to learn when it was safe to bathe, get a haircut, take medical treatment, and so forth.

Shrine at Lourdes, France, showing crutches discarded by afflicted persons cured by faith.

by
EARLE R. BUELL

Cheer up, have faith—it's good for your health. That's the verdict of scientists who have been experimenting to determine effectiveness of remedies employed by ancient medicine men, astrologers, and modern faith healers. This article explains why some people actually do get well when they have a strong belief they are going to get well.



Worry, despondency, grief, pessimism are fatal to health. These emotions cause high blood pressure. Victim may seek relief from nervous tension in drink, which leads to weakness of heart and early death.

OPTIMISM is better than apples for keeping the doctor away.

There is a scientific basis for faith healing.

Even some ancient superstitions had healing power and the hocus-pocus of the tribal medicine man may have saved many lives.

These are some of the conclusions arrived at by a group of experimenters who have been endeavoring to test out the effect of states of mind upon the general health.

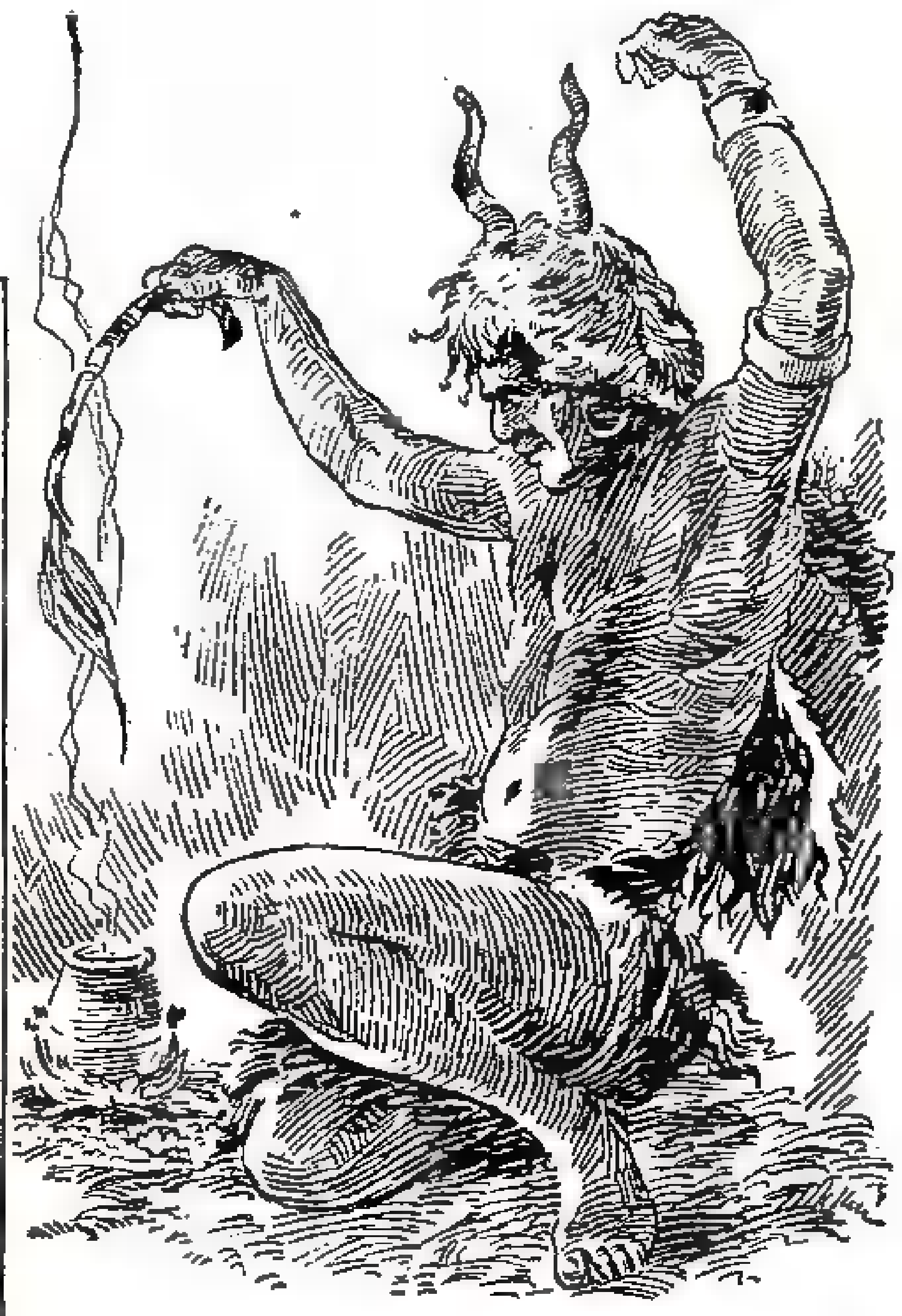
Applying the scientific methods of the clinic and the laboratory to their work, the investigators at first set out to find out which if any of the healing systems widely practiced by various cults could be shown to have any therapeutic value. Very much to their amazement they found evidence that not only these cults but any religion devoutly accepted by the individual had certain definitely traceable physical effects of a beneficial nature.

The discoveries went even farther, indicating that any optimistic or inspiring thought was valuable for healing and that some miraculous appearing cures had actually been effected by the reassuring words of a doctor in whom the patient had confidence without any treatment at all.

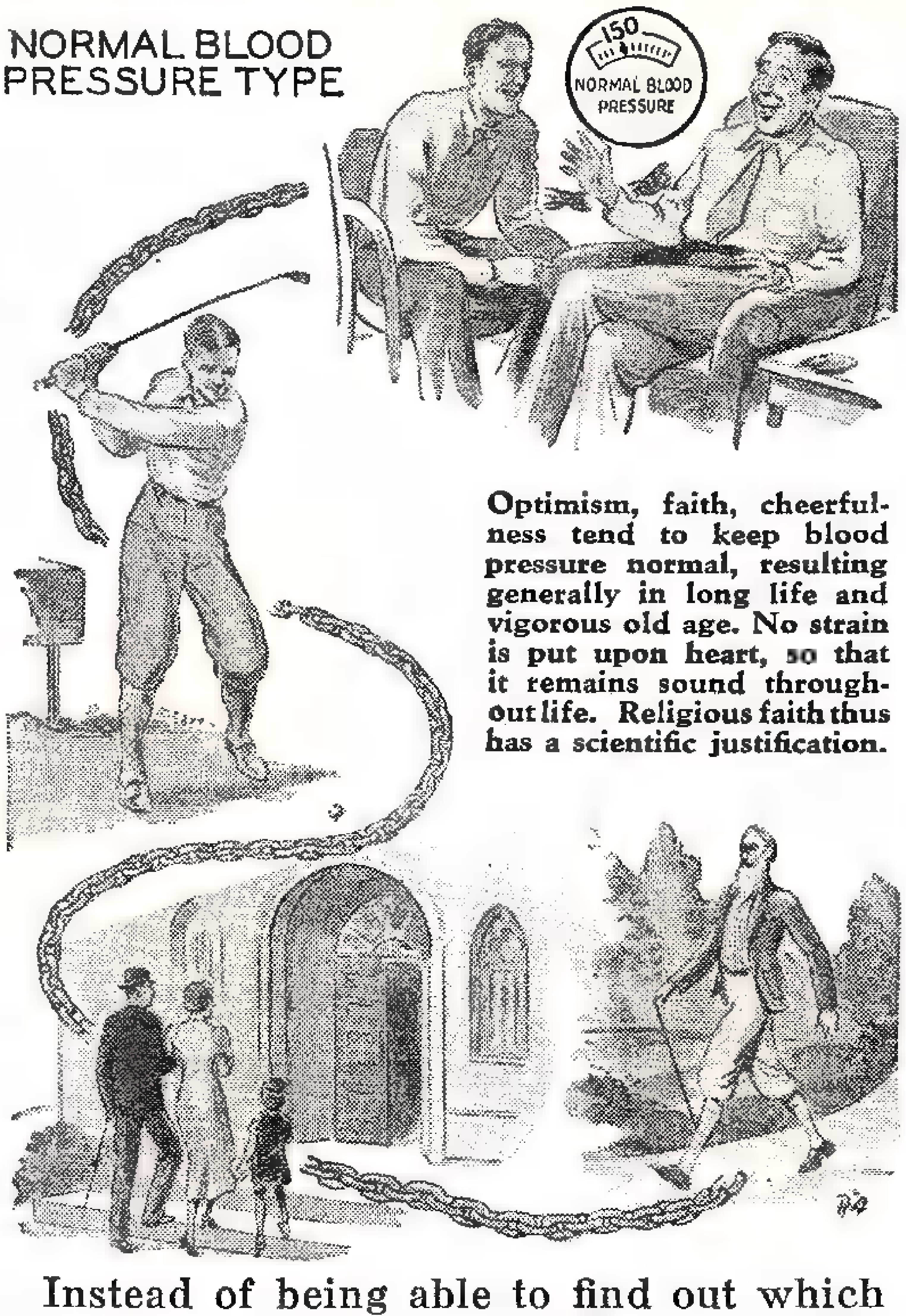
On the other hand, it was found that a long list of emotions related to fear had exactly opposite effect and that to embrace a philosophy of pessimism was about on a par with warming an asp in the bosom.

Ancient Medicine Men

Worshippers praying at grave of a priest for deliverance from physical ailments. Belief in potency of prayer frequently results in cure, experimenters have found.



While mystic hocus-pocus of ancient medicine men was scientifically impractical, it actually cured [redacted] sufferers who strongly believed they were going to get well.



Optimism, faith, cheerfulness tend to keep blood pressure normal, resulting generally in long life and vigorous old age. No strain is put upon heart, so that it remains sound throughout life. Religious faith thus has a scientific justification.

Instead of being able to find out which sect was nearest to the truth as had been intended, experimenters found that truth or falsity of a sincere belief seemed to make no appreciable difference in its curative effect. This gave rise to the realization that countless supposedly silly superstitions had probably improved the health of those who believed in them.

As a result, there arises the possibility of testing the sincerity of religious convictions by means of the blood pressure gauge and other instruments and, while it is not suggested that these instruments will be installed at the church altars, there is said to be ample evidence that positive results could be obtained by this means.

The findings of the experimenters have dovetailed to a large extent with those of Dr. William S. Sadler of Chicago University, although the experimenters were without a knowledge of Dr. Sadler's works, and they are taken to be mutually corroborative.

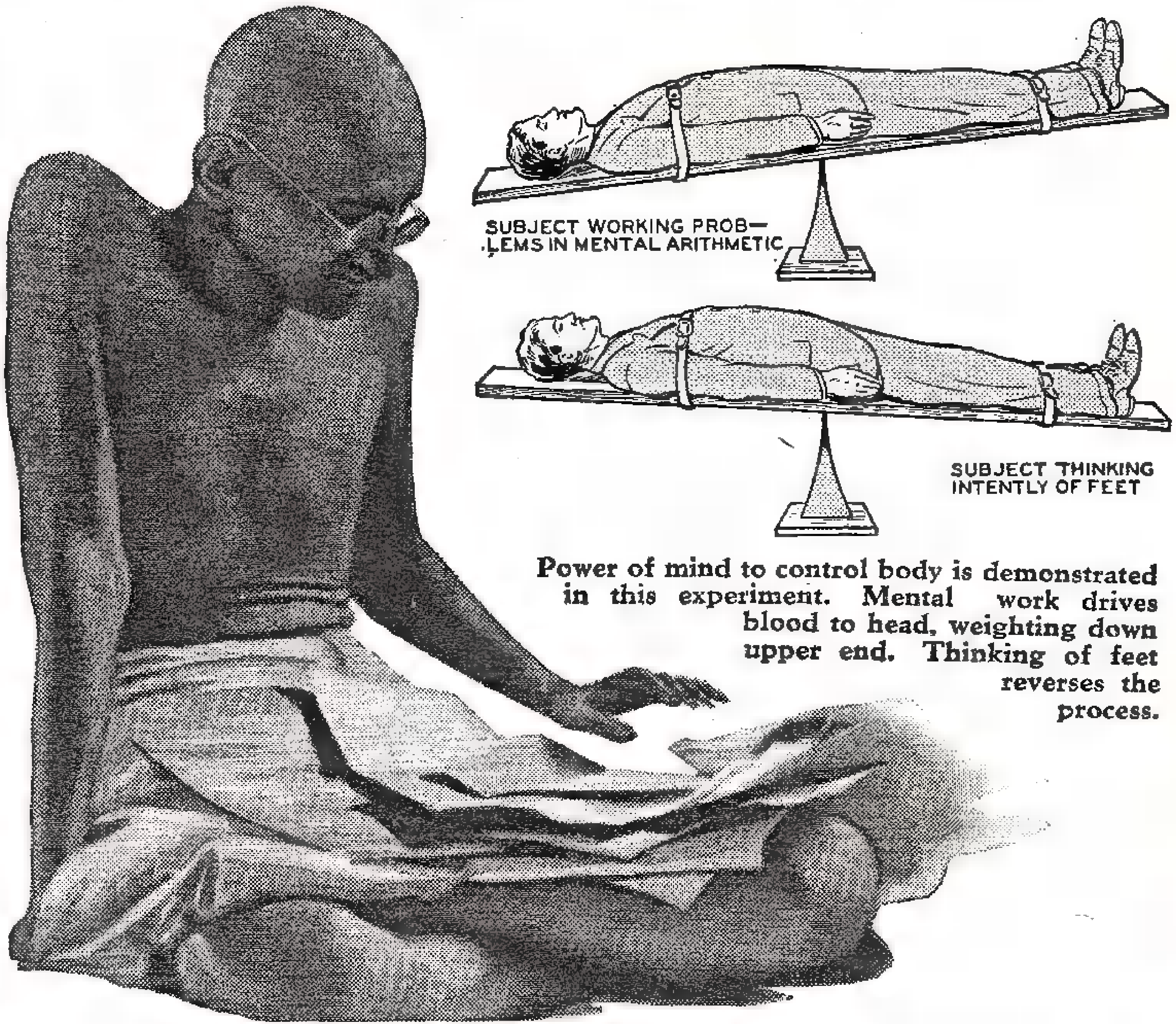
They are said also to be in line with the prophecy of Dr. Charles P. Steinmetz, famous physicist, who shortly before his death predicted that science in the near future would turn to spiritual matters and that developments in this field would be similar to those in the physical and material realm.

One of the more remarkable discoveries recently made is that there is apparently a scientific basis for the healing principles of faith, hope and charity or love as described in the Bible and it is indicated that any inspiring writings and the encouraging or uplifting words of any admired or revered speaker may be sufficient to effect rather startling cures in some instances.

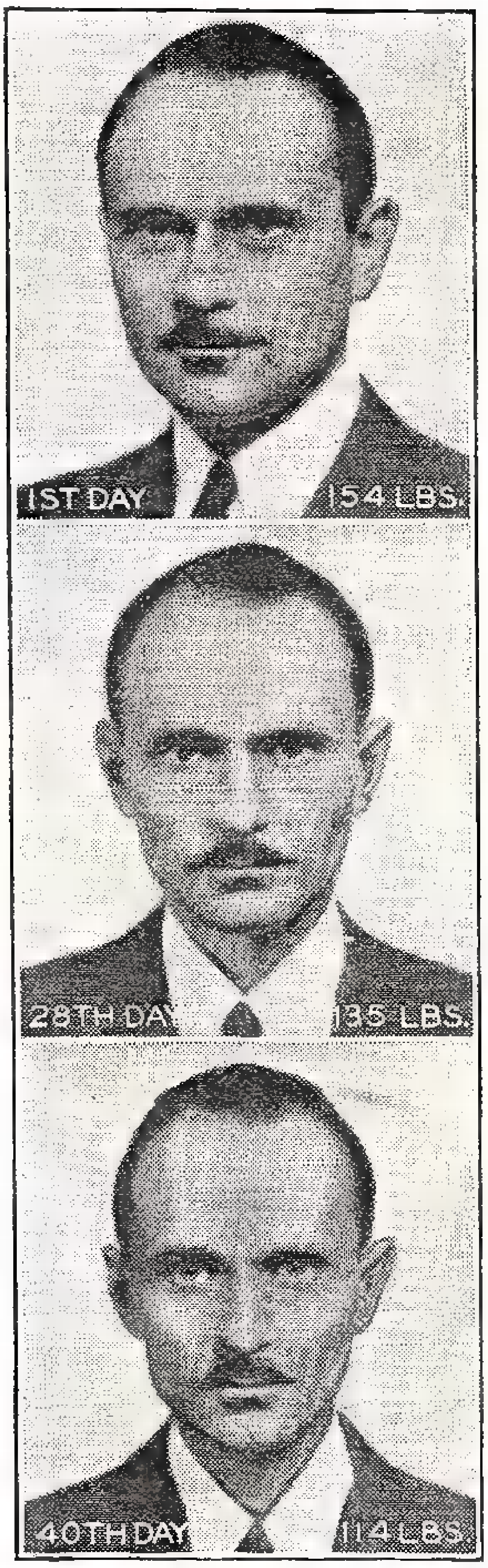
The time may very well come when a doctor's prescription will read: "See your priest, minister or other religious adviser." Public intuition has for some time been directing large numbers of persons back to their churches for physical as well as mental and spiritual assistance, it is said, and a period of increased interest in the church is prophesied.

Beginning first with a study of religious

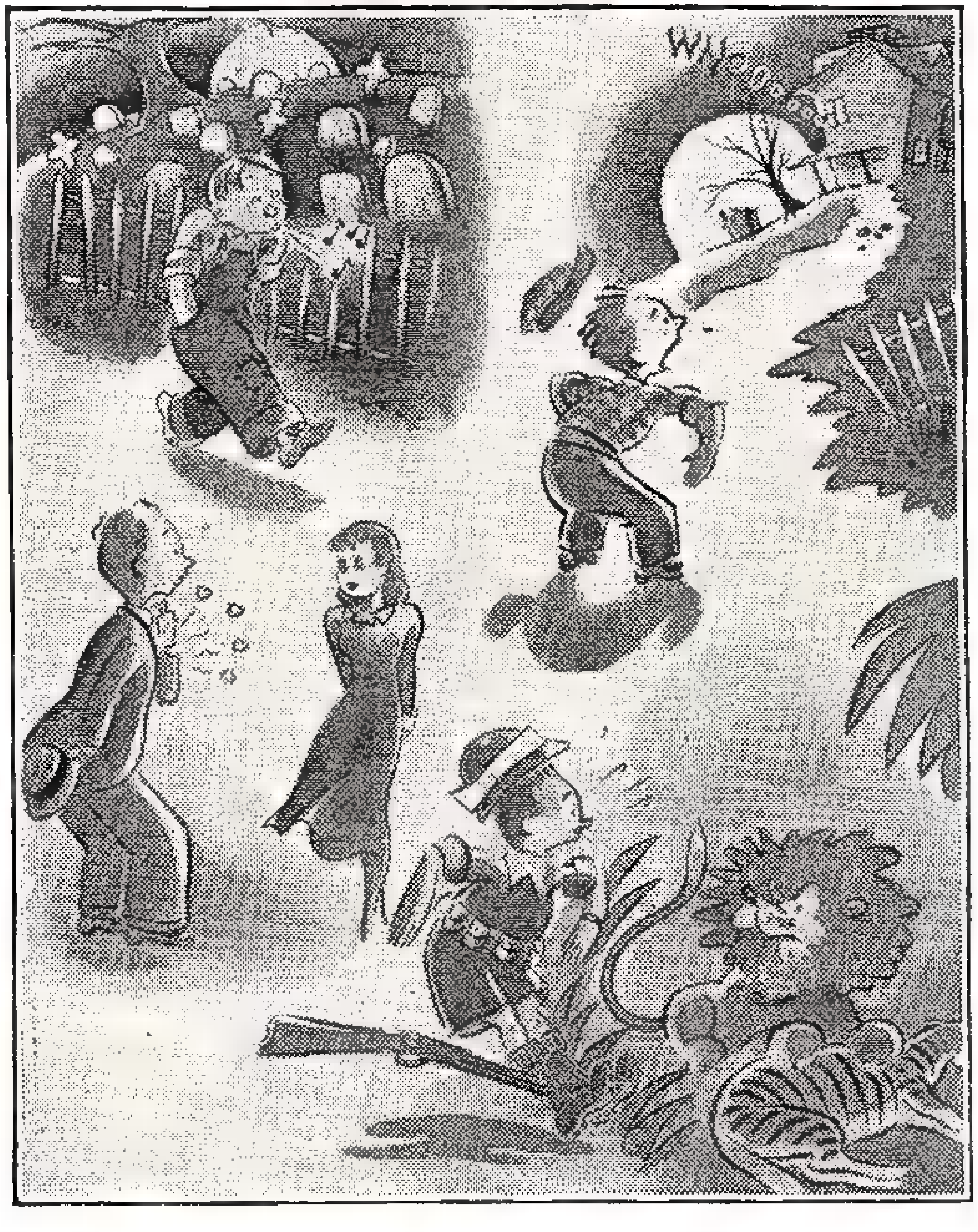
Religious Emotions Carry Gandhi Safely Through Fast of Three Weeks


SUBJECT WORKING PROBLEMS IN MENTAL ARITHMETIC
SUBJECT THINKING INTENTLY OF FEET

Power of mind to control body is demonstrated in this experiment. Mental work drives blood to head, weighting down upper end. Thinking of feet reverses the process.


1ST DAY
154 LBS.
28TH DAY
135 LBS.
40TH DAY
114 LBS.

Above left—Mahatma Gandhi, whose faith and religious zeal carried him safely through three weeks' fast, despite warnings that he could not survive. Right—How you would look after going without eats for 40 days. Fasting experiment was undertaken by Battle Creek, Mich., man to prove that 40 days of abstinence from eating is beneficial to the body.



Conclusive proof that the mind affects the heart is given in situations illustrated here. Fright, love, superstitious fear speed up the pulse, putting heavy strain on the heart.

healing and recognizing the fact that savage races since the beginning of history have looked to their medicine men both for religious guidance and physical healing, experimenters have followed the course of healing through the story of many religious sects to the present day.

They found that belief in faith healing or prayer cures had never died out though it had often fallen into disrepute. In studying the superstitions of other days, they found many that dealt with healing and came to the conclusion that even the most ridiculous might effect cures if completely accepted by the patient.

That some of these must, however, have severely taxed the credulity of the individual, is indicated by some of the superstitions studied.

A cure for warts and corns was found which required the patient to lie on his back along a boundary line on the twentieth day of the month with the hands extended over the head. With whatever thing could be grasped while so doing, he was to rub the warts and they would immediately disappear.

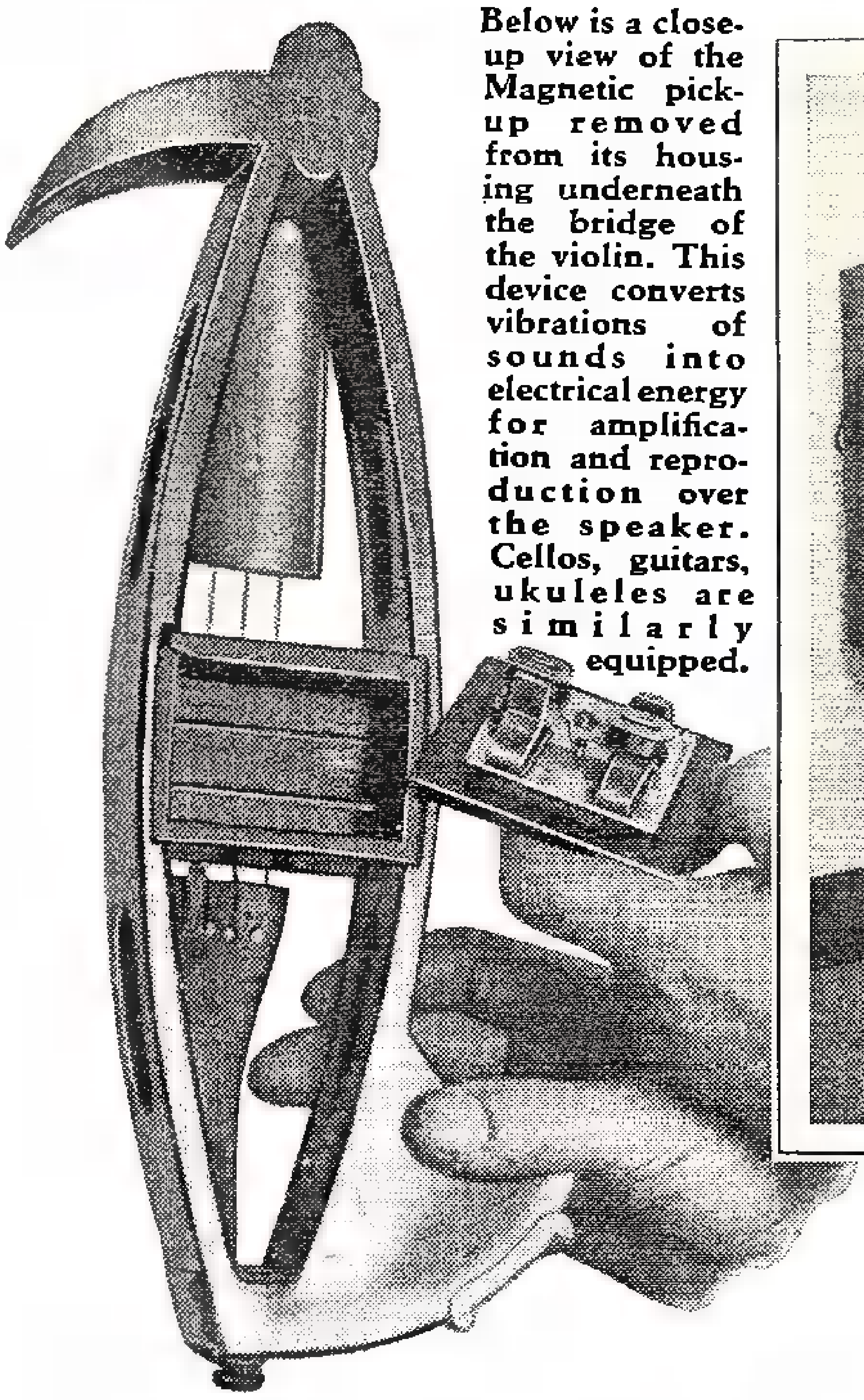
Corns were to be cured by watching for a shooting star and, on seeing one, immediately pouring vinegar upon the hinge of a door.

For headache, the patient was instructed in one instance to tie about the forehead a piece of rope used previously for the hanging of a criminal.

The eye of a wolf rubbed upon a diseased

(Continued on page 13)

Electric Violin Has No Sounding Board



Below is a close-up view of the Magnetic pick-up removed from its housing underneath the bridge of the violin. This device converts vibrations of sounds into electrical energy for amplification and reproduction over the speaker. Cellos, guitars, ukuleles are similarly equipped.

A recital being given with one of the new violins and cellos. Output of the pick-up is here seen utilizing amplifier and speaker of ordinary home radio set for reproduction. Volume from violin fills auditorium.

A VIOLIN that has no sounding board has made its appearance in the musical world. Instead of the usual tone chamber, this violin has only a light skeleton frame, but concealed under the bridge is a small pick-up of the electro-magnetic type.

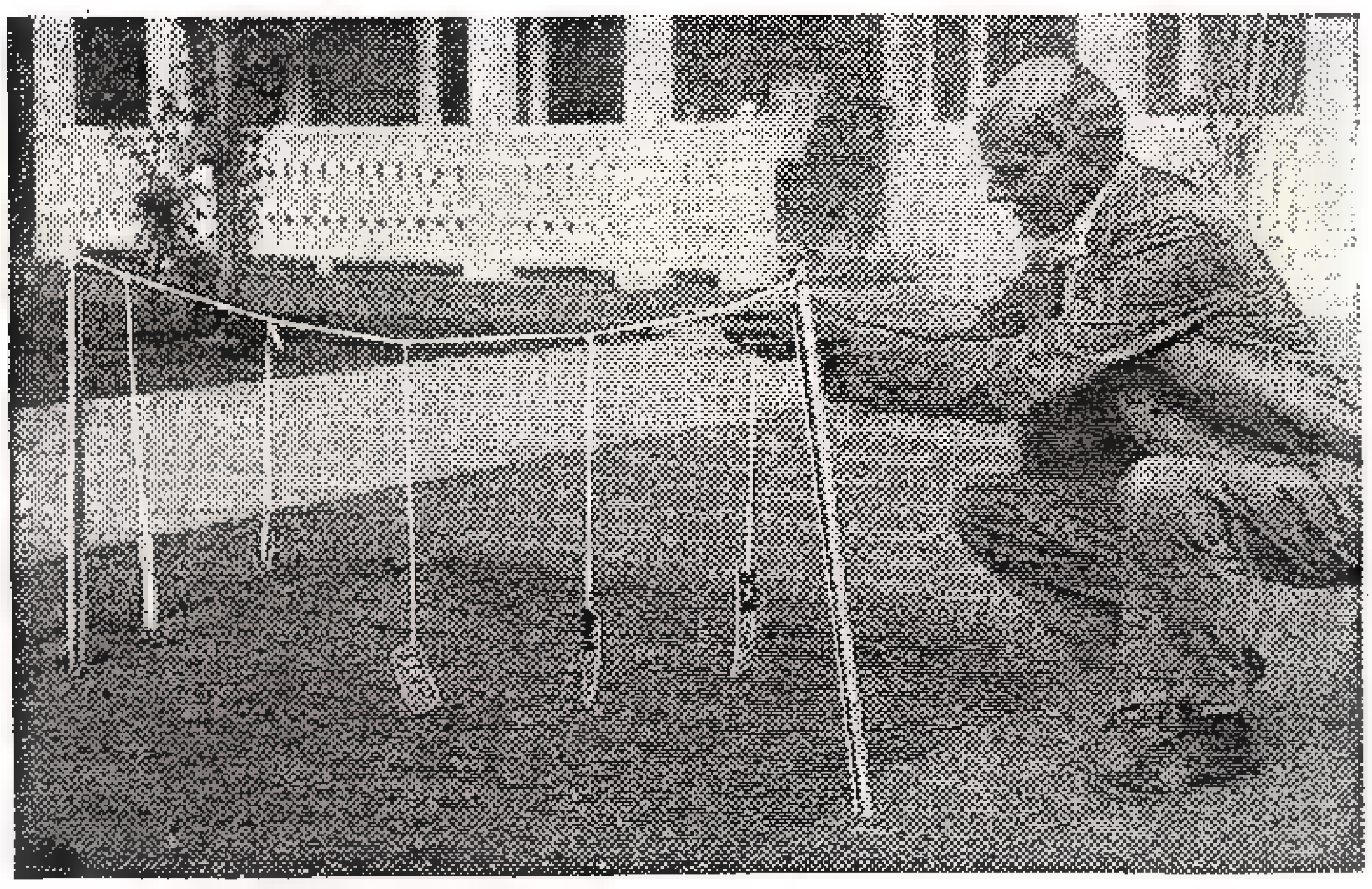
When the violin is being played, the vibrations of the string and bridge are converted into electrical energy by the pick-up and this energy is then carried into an amplifying unit and a loud speaker.

On the amplifier a variable tone and volume control changes the timbre and generates a volume that fills an entire auditorium.

Keeping Birds From Flower Beds

A SAN ANTONIO, TEXAS, amateur gardener has devised a simple stunt to keep sparrows and other birds away from his flower beds. He places a stick in the ground on each side of the bed and ties a string between them, as illustrated in the photo below. From this string he hangs other strings about ten inches long, to which are tied small pieces of bright tin or other metal. The metal pieces flutter in the air and keep the birds frightened away, the device at the same time being somewhat ornamental, too.

Best results will be had if you keep the metal bits polished brightly at all times. Pieces of broken mirror are suitable.



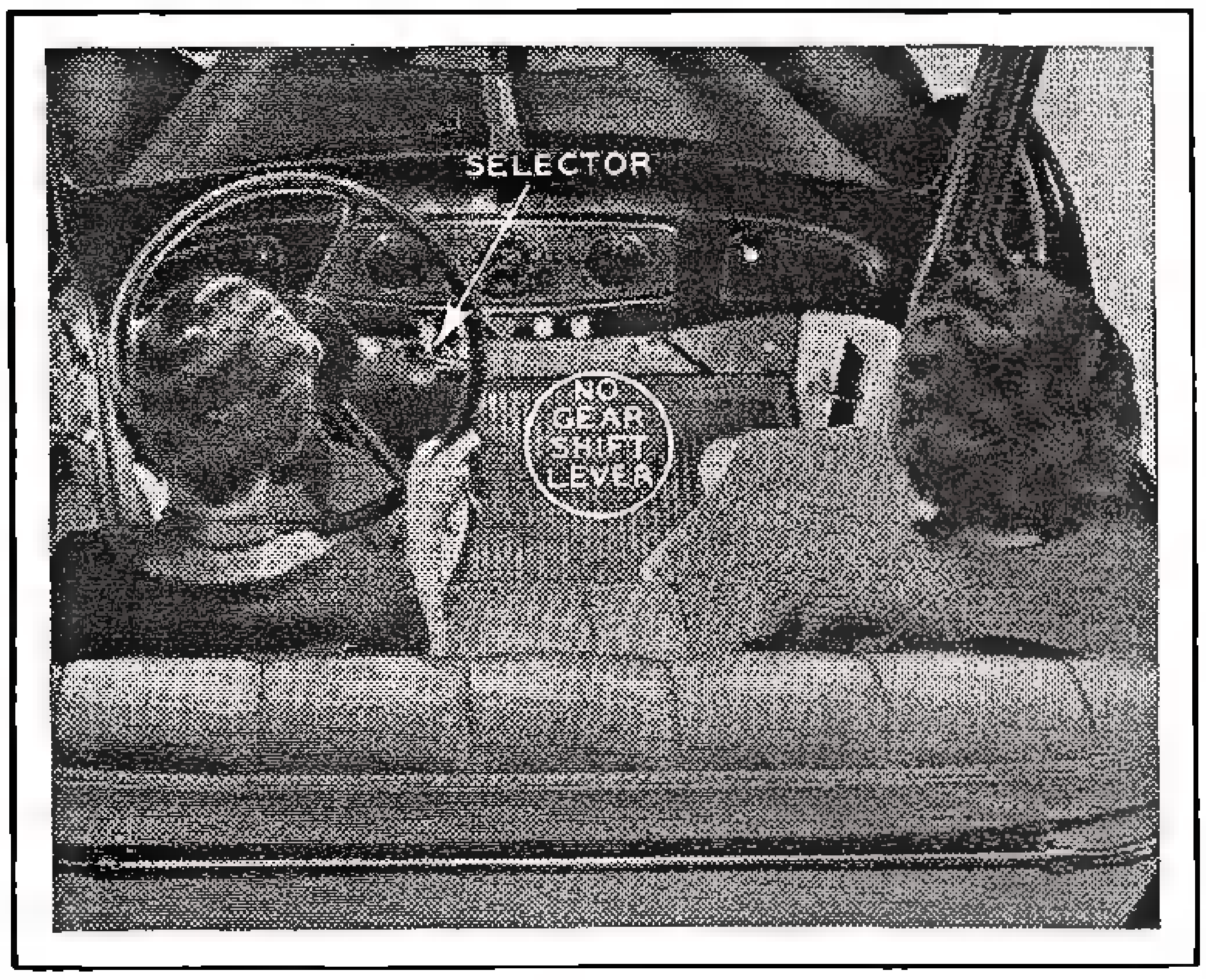
Predatory birds are frightened away by small pieces of tin attached to string depending from string hooked to posts.

Cap on Paste Tube Can't Get Lost

MODERN MECHANIX AND INVENTIONS Needed Inventions department has borne fruit in a unique tube cap which is now being marketed. Shown at the right, the cap unscrews like its brothers, but will not come off and get lost. When screwed down tight, the opening in the top is closed, but when untwisted, the tip opens to permit the outflow of paste, cream, etc.

Screwing down cap closes the opening, unscrewing opens tip.

Self-shifter on Popular Car Eliminates Gear Shift Lever



To start popular new car without gear shift lever, driver simply moves the selector on the dash, releases the clutch and steps on the gas. "Low," "second" and "high" is then thrown in automatically as the car gains speed.

AN OUTSTANDING motor car manufacturer is now producing a car without a gear-shift lever. To get away from a standing start, it is only necessary to move a "selector" on the dash, release the clutch and step on the gas.

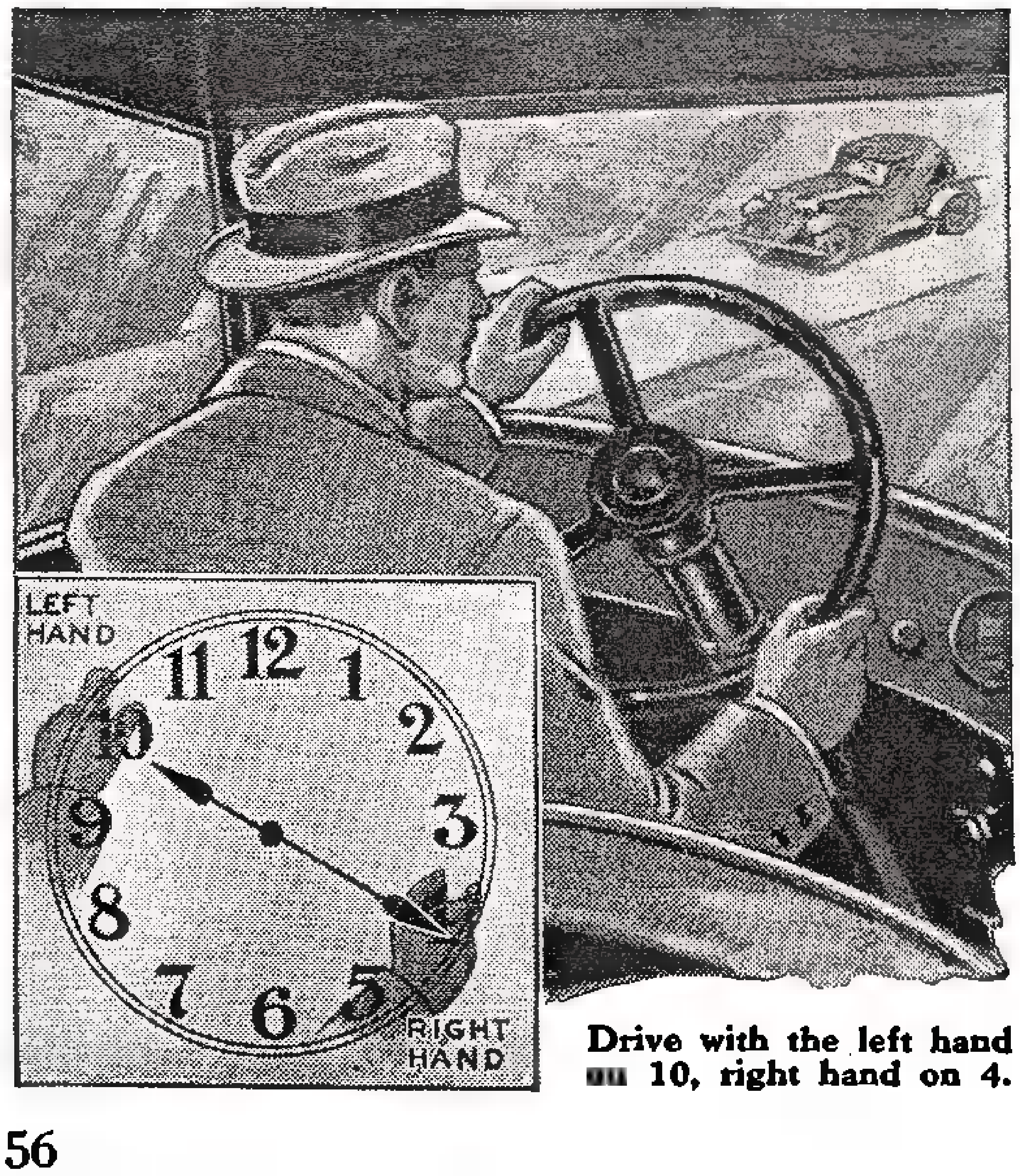
The action from this point on is automatic and the car is said to move forward with the silence and smoothness of a steam car, as the new device progressively selects the proper ratios to synchronize with the car's momentum.

The device is said to function perfectly, all the way from a snail's pace to maximum speed, with infinitely more consideration of the engine than 99% of drivers have. The absence of the gear-shift lever also provides more room for driver and passengers.

Proper Hand Position for Driving

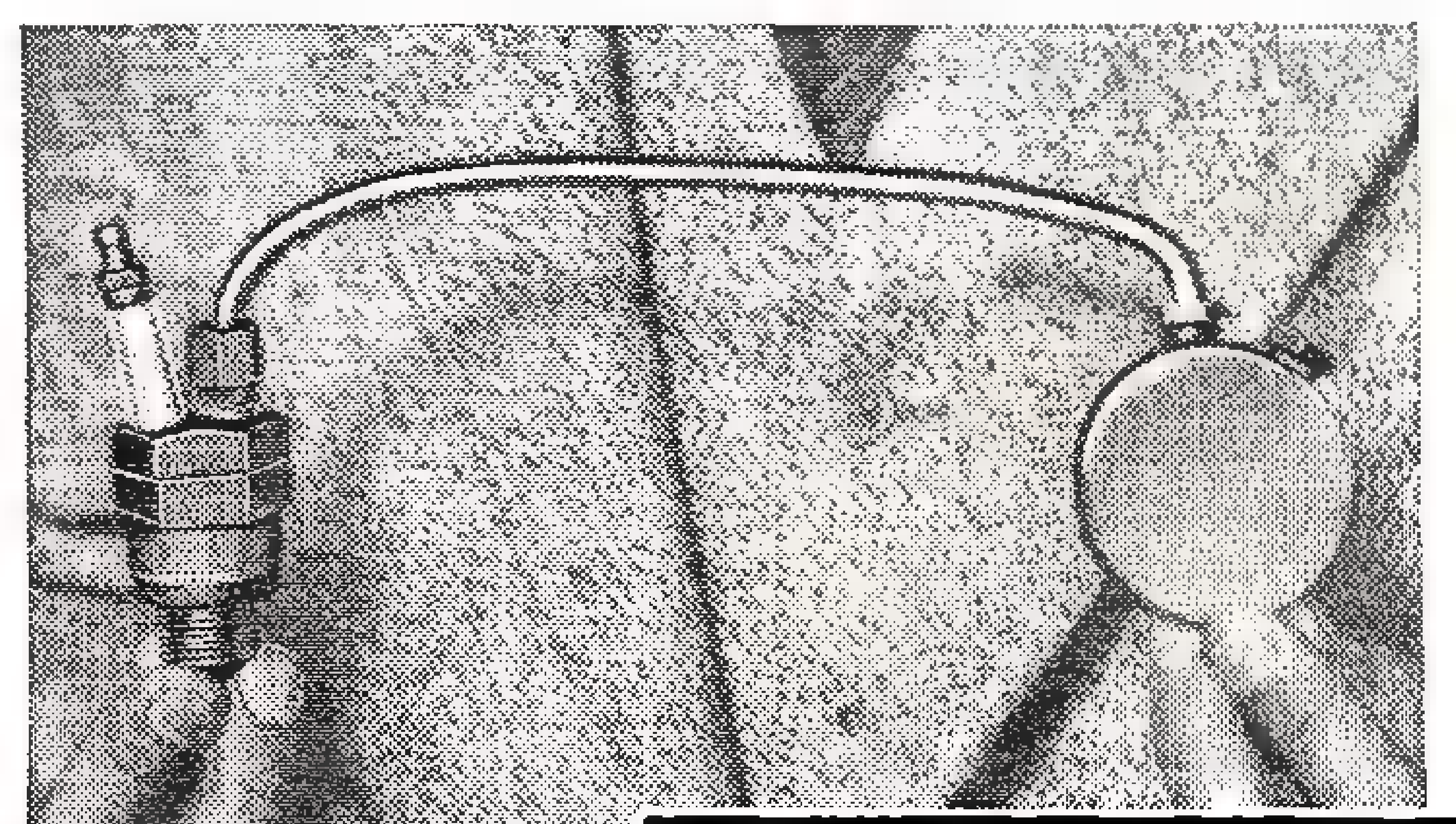
THE correct way to hold the steering wheel of an automobile when driving is specified as the "twenty minutes past ten" position by the National Safety Council. This means that the driver's left hand grasps the rim of the wheel at about the place of the ten o'clock hour figure on a clock dial, while the right hand grasps the wheel about where the clock's minute hand stands at twenty minutes past the hour.

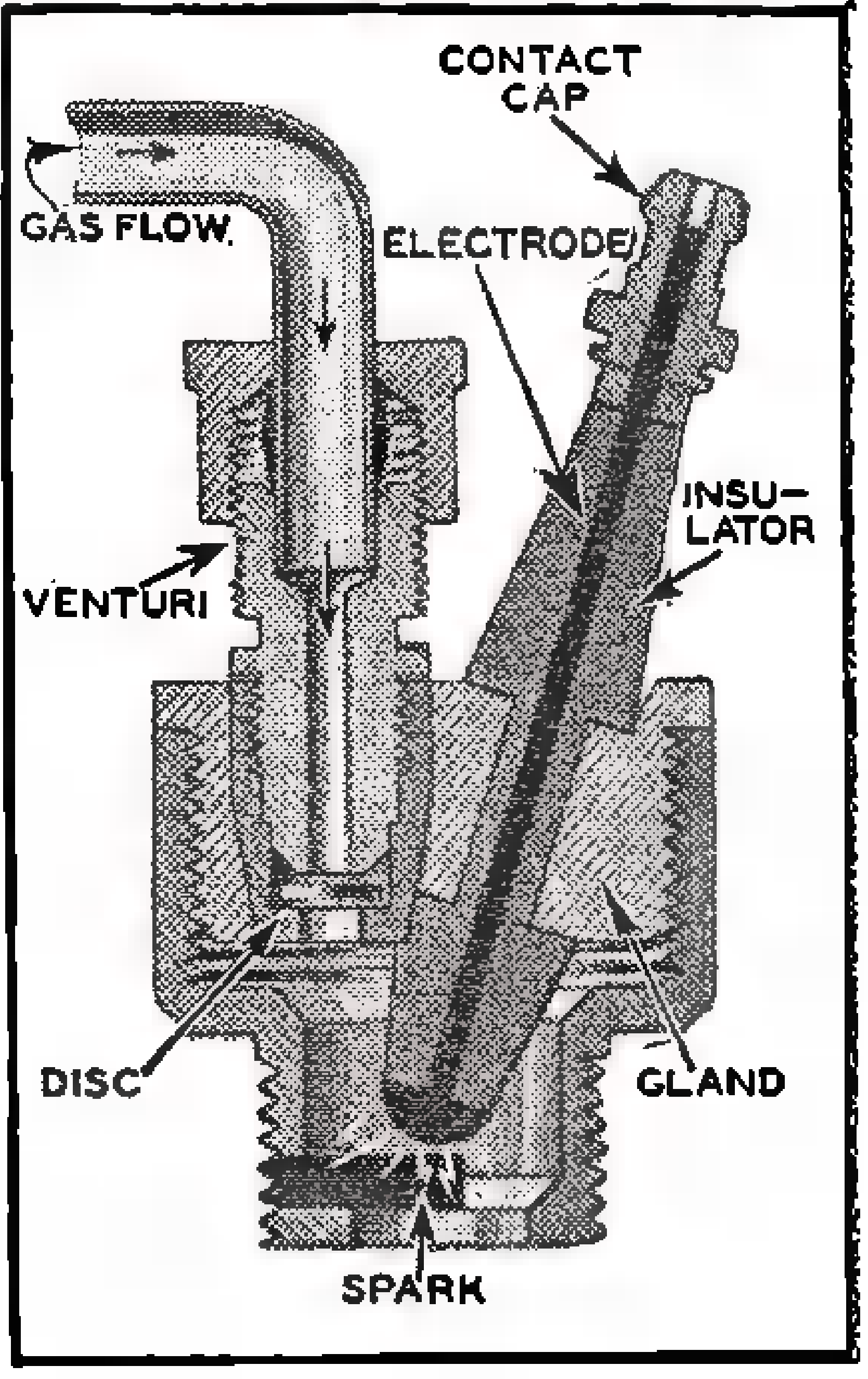
There is no time magic in these positions. They merely are the places where each of the hands has the most desirable leverage on the wheel in case of sudden emergency and where the driver's bodily position is likely to be safest and most suitable in other ways. Also, these positions bring right hand close to gear shift lever so this can be reached in a hurry.



Drive with the left hand on 10, right hand on 4.

New Sparkplug Is Self-cleaning





Above is seen the new self-cleaning sparkplug ready for installation. Drawing at right illustrates construction and operation. Feed pipe passes a small amount of gas into the chamber before each spark. Constant ignition of this gas keeps the interior clean and prevents accumulation of carbon.

A NEW sparkplug now on the market is said to be self-cleaning and to outwear the automobile in which it is installed. The feed pipe passes a very small amount of gas into the chamber before each spark. The constant ignition of this gas keeps the interior thoroughly clean and prevents the accumulation of carbon.

The amount of gas used by these plugs is negligible. They are said to actually reduce gas consumption by insuring a steady flow of power from all cylinders. They can be quickly installed in any ordinary motor. The plug acts as a primer and it is not necessary to use choke in cold weather.

Economic Science Explains the Meaning of Inflation

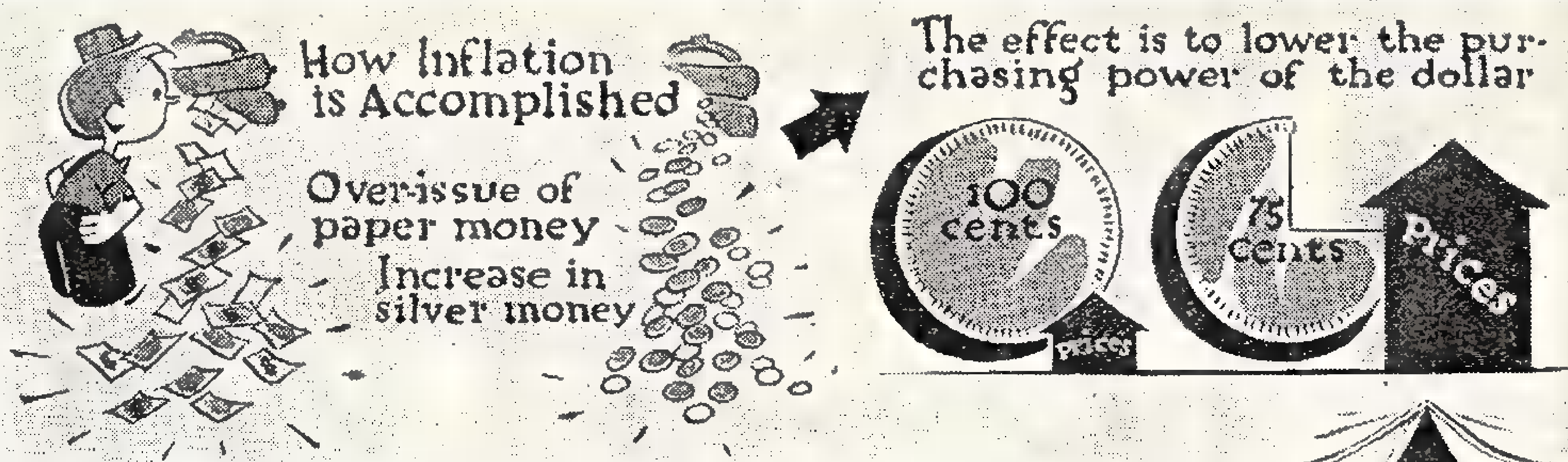
EVERYBODY'S TALKING ABOUT IT—HERE'S WHAT IT IS:

How Inflation is Accomplished

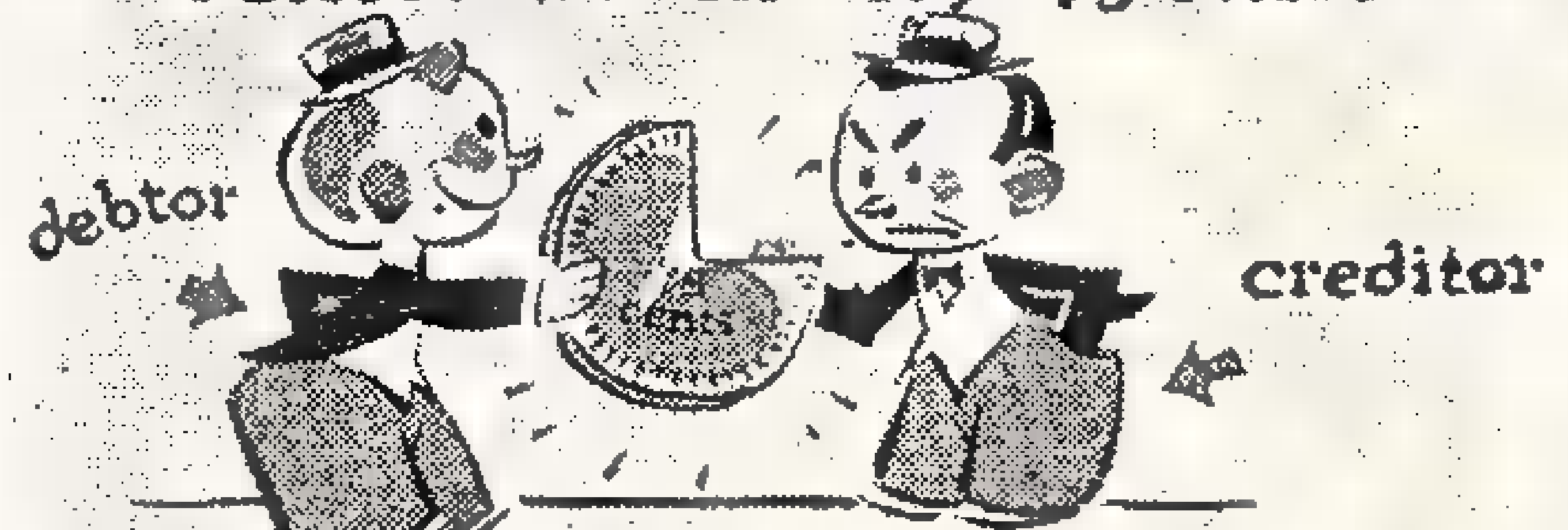
Over-issue of paper money

Increase in silver money

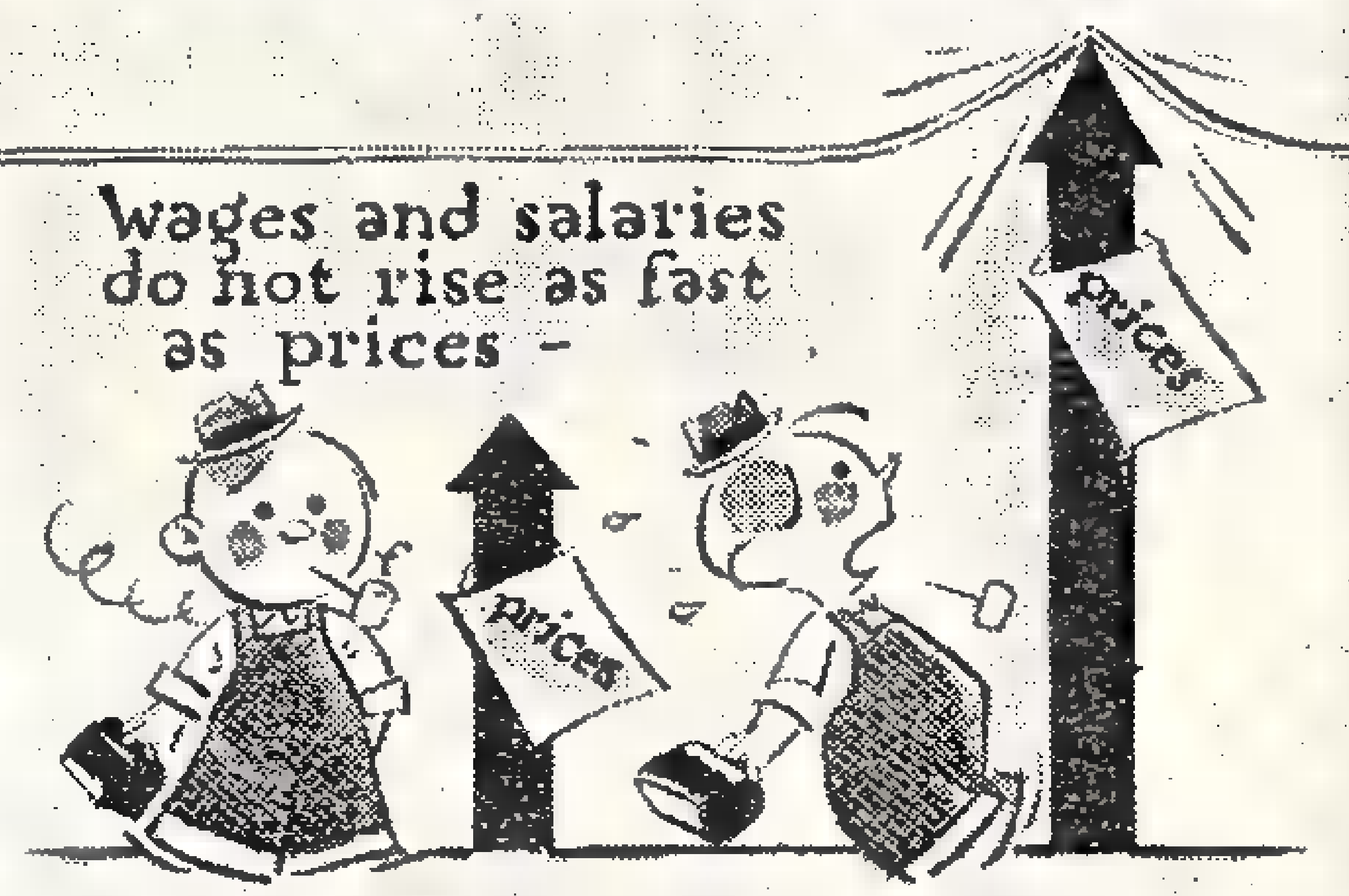
The effect is to lower the purchasing power of the dollar

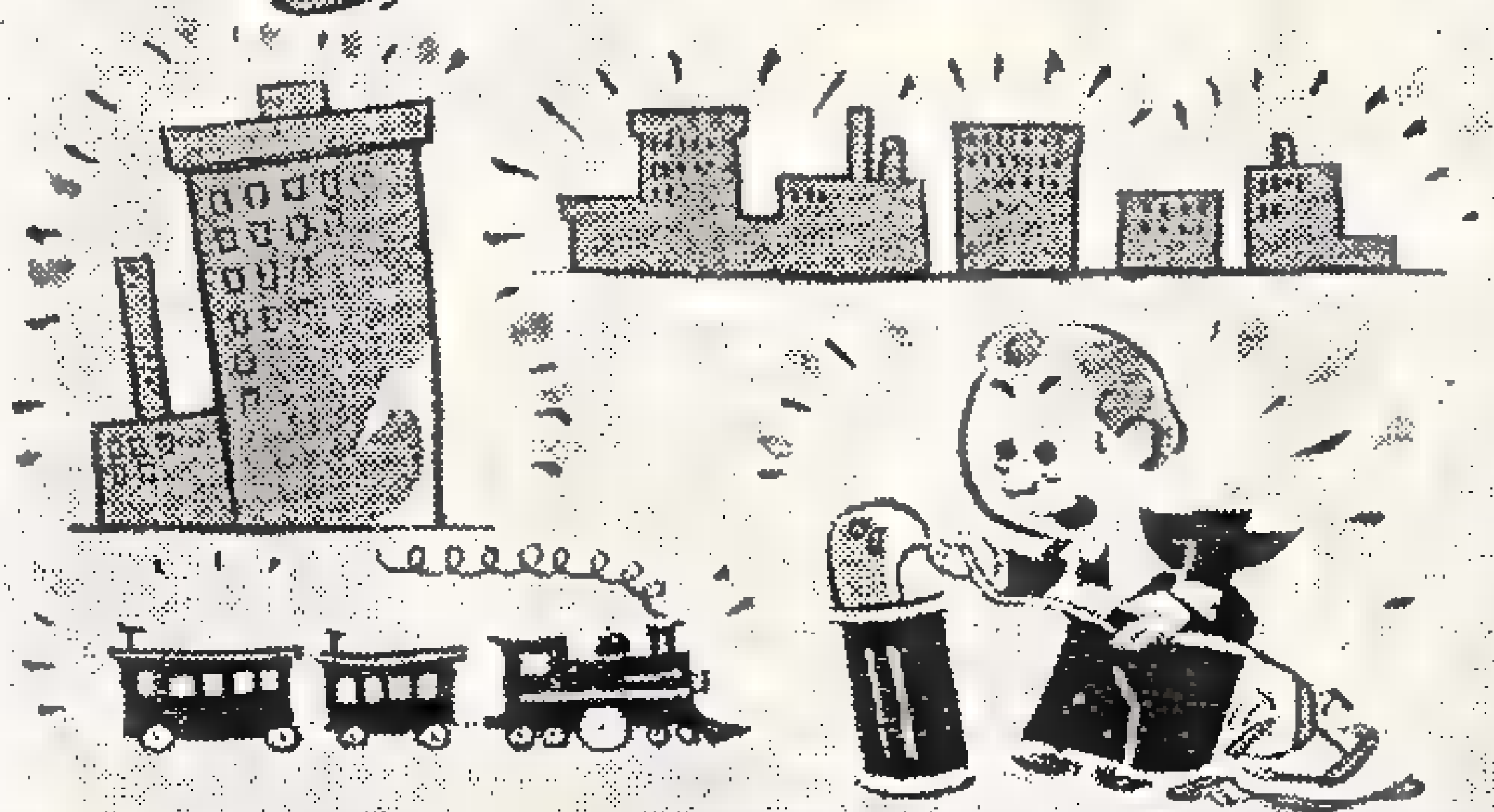

100 cents
prices
75 cents
Prices

This makes it easier for the debtor to pay off his debts in dollars worth - say 75 cents


debtor
cents
creditor

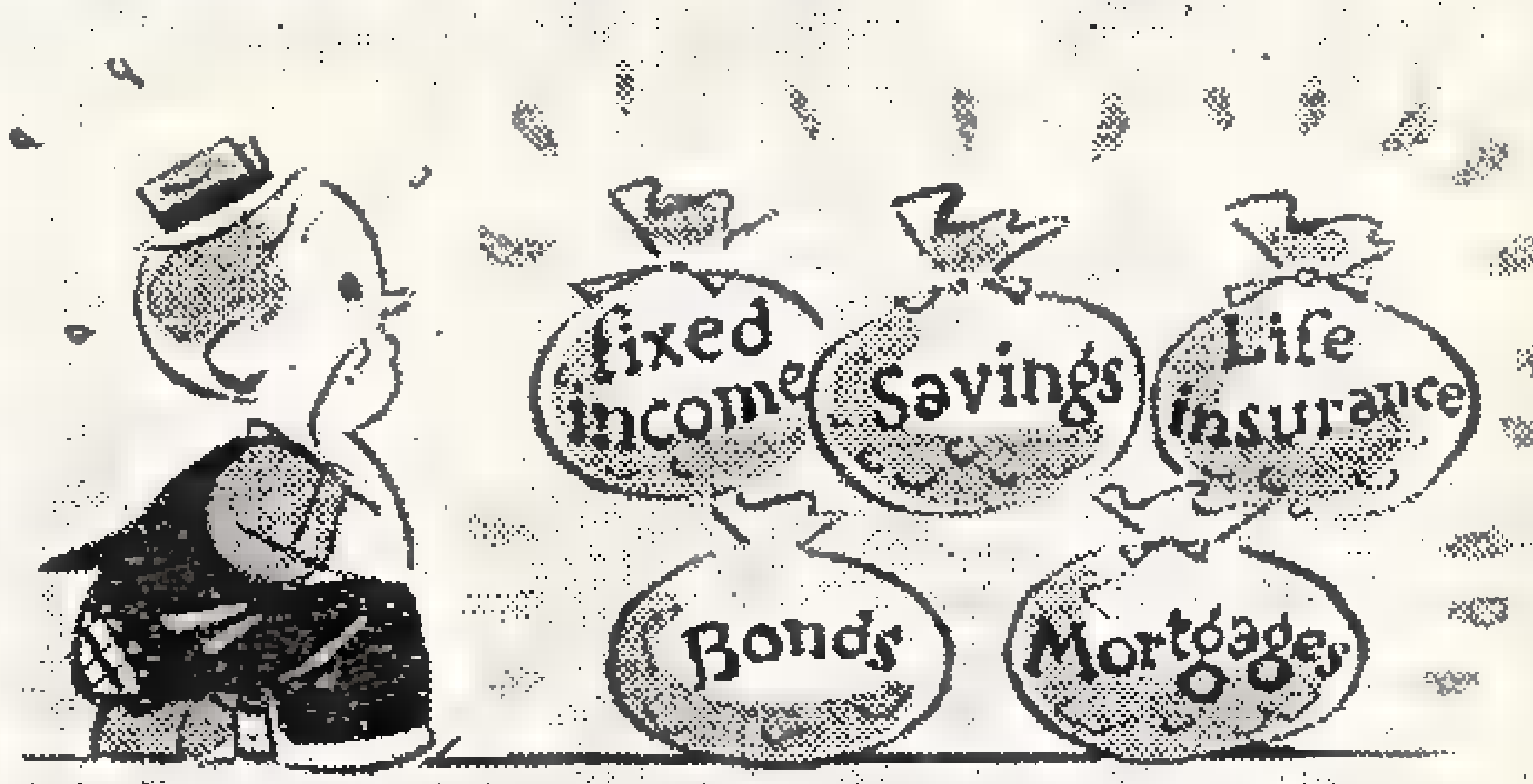
Wages and salaries do not rise as fast as prices -


prices
prices



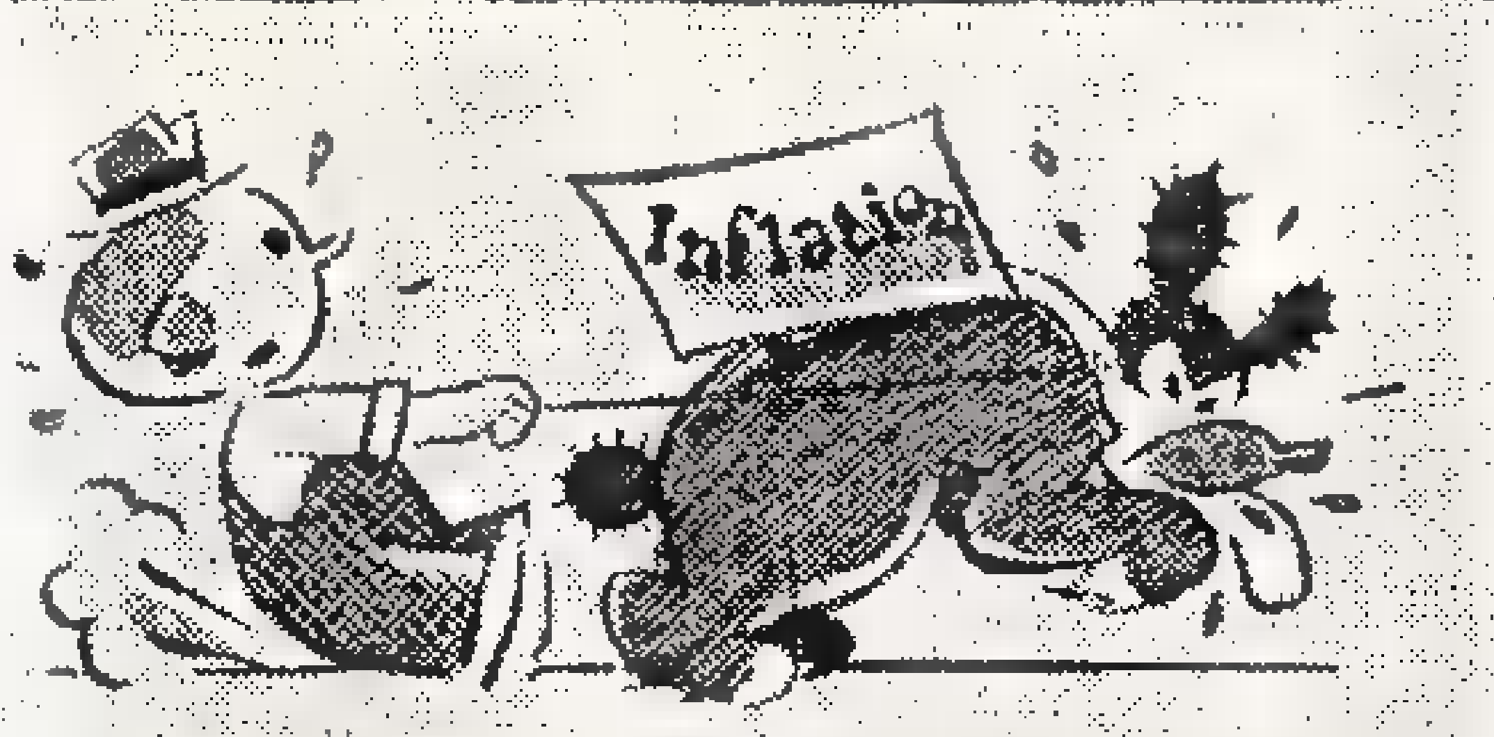
Who gains by Inflation?

Corporations with large bonded indebtedness - heavily bonded cities - life insurance companies - railroads - agile speculators


fixed income
Savings
Life insurance
Bonds
Mortgages

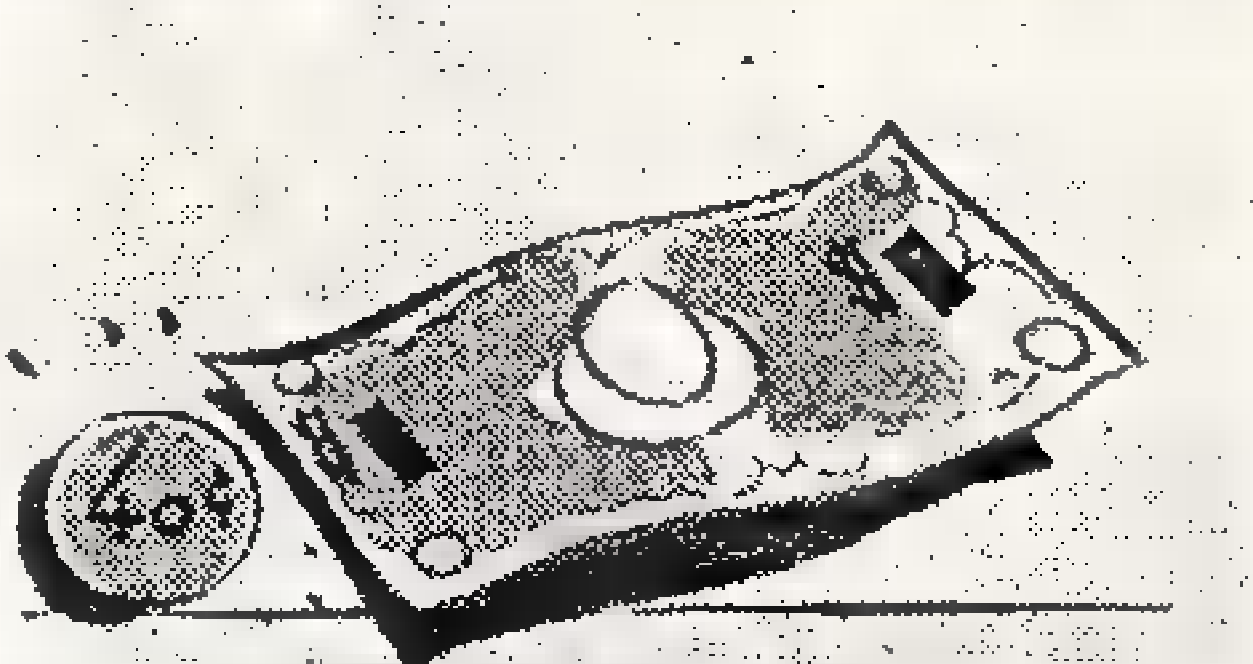
Who loses by Inflation?

The wage earner - until wages catch up to prices - and everybody with money on deposit - in hand - or in investments making a fixed cash return



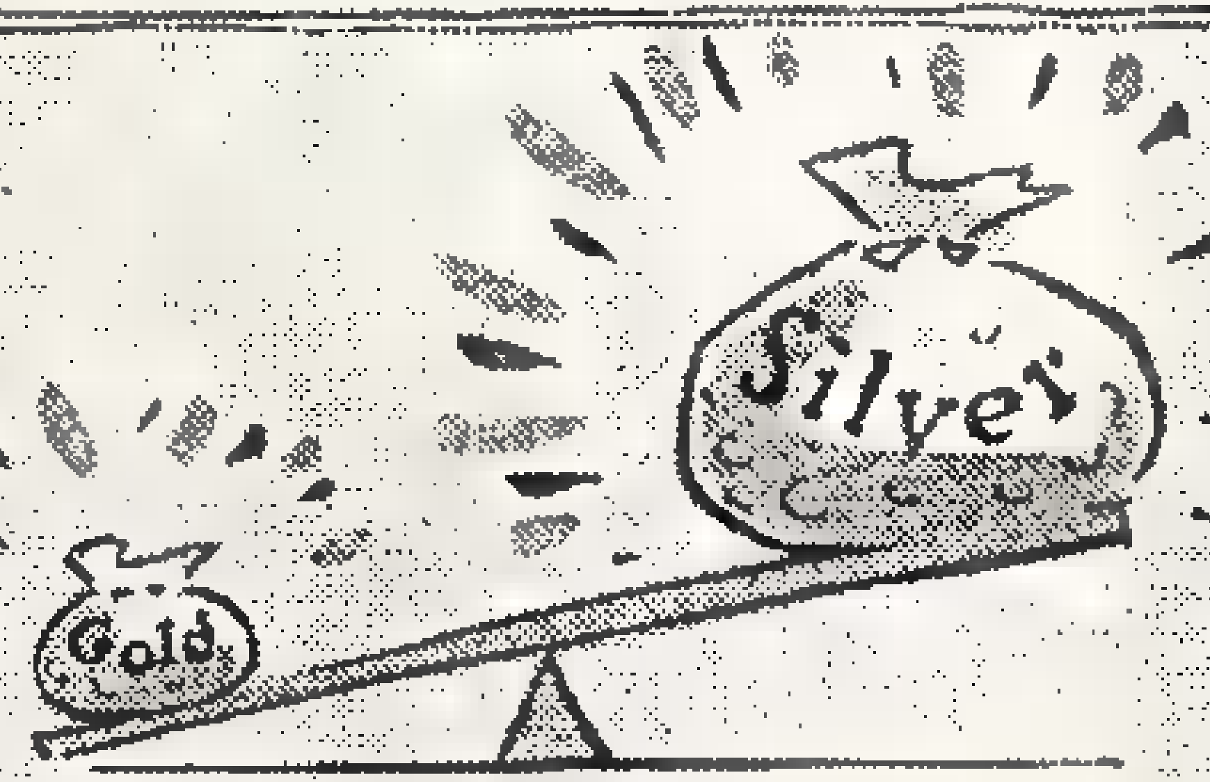
Can Inflation be kept within bounds?

Difficult because controlled inflation doesn't produce startling enough results - Inflation raises all prices proportionately - doesn't adjust inequalities of the price structure.



The Gold Standard

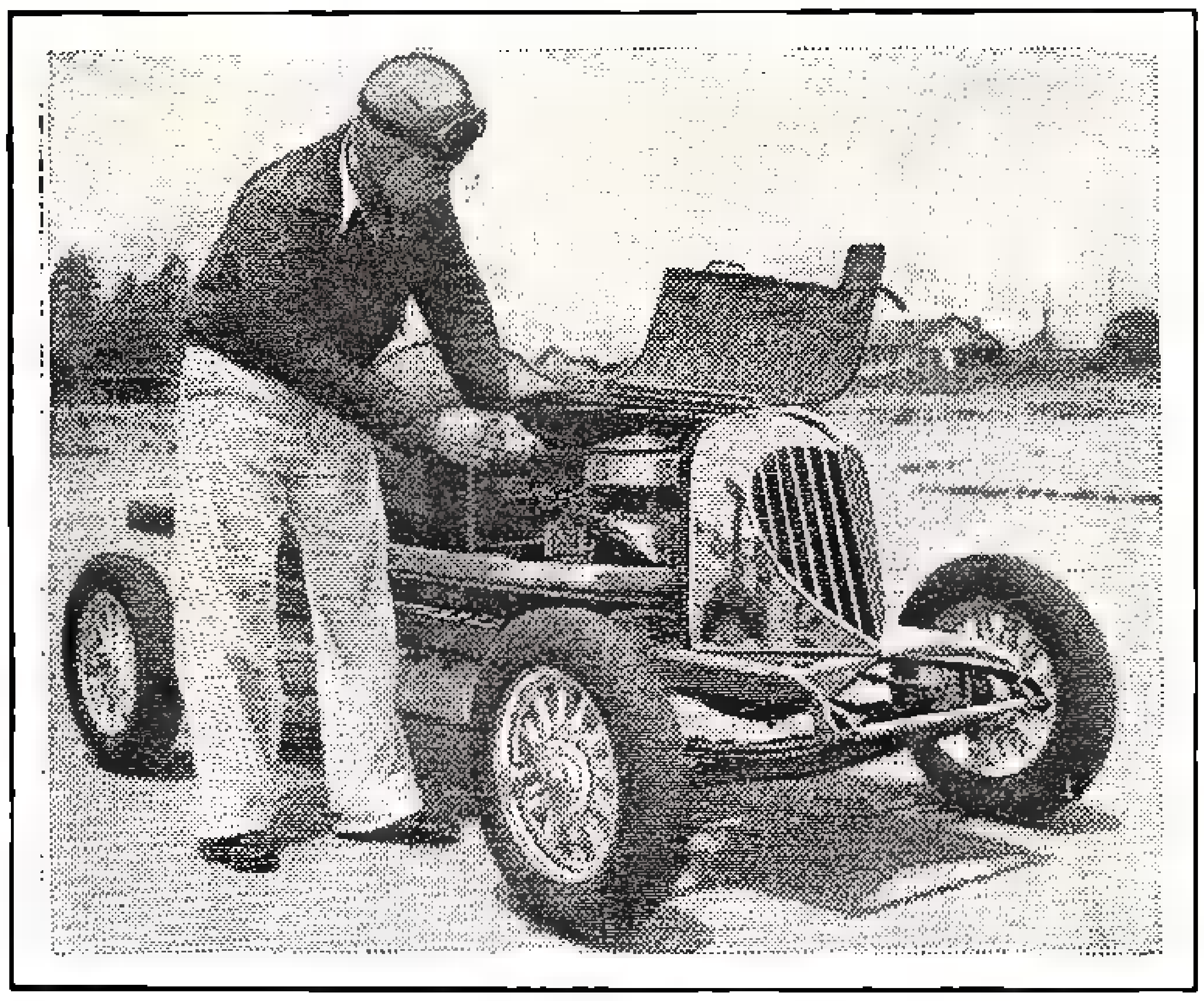
When gold, given a fixed price is the measure of value of a currency, the country is on the gold standard. In the United States there is but 40 cents in gold back of every dollar.


Silver
Gold

Bimetallism

The free coinage of two metals (as gold and silver) in fixed ratio to each other is bimetallism. Difficulty of bimetallism is in keeping the ratio constant, cheaper metal tending to drive out dearer.

25 H. P. Outboard Speeds Midget Racing Car 100 M. P. H.



Billy Betteridge, of Los Angeles, starting outboard motor which powers his neat little 100 m.p.h. midget racing car.

TO Billy Betteridge, of Los Angeles, should be awarded some kind of a prize for the craftsmanship that went into the construction of a keen little midget racing car job he turned out in his workshop.

The power plant of this remarkable vehicle is a 25 h.p. outboard. Installed under the hood as illustrated at the left, the motor drives the bus along at an exhilarating clip of 100 m.p.h. Special mountings allow the motor to be taken out and replaced in a boat.

Dimensions of interest are: Length, 7 feet; wheelbase, 65 inches; tread, 40 inches. The body is of aluminum, while the tail, hood and pan were made from an old airplane cowling. Photo shows Billy starting motor of his neat little bus.

Rash Turns Negro Man White

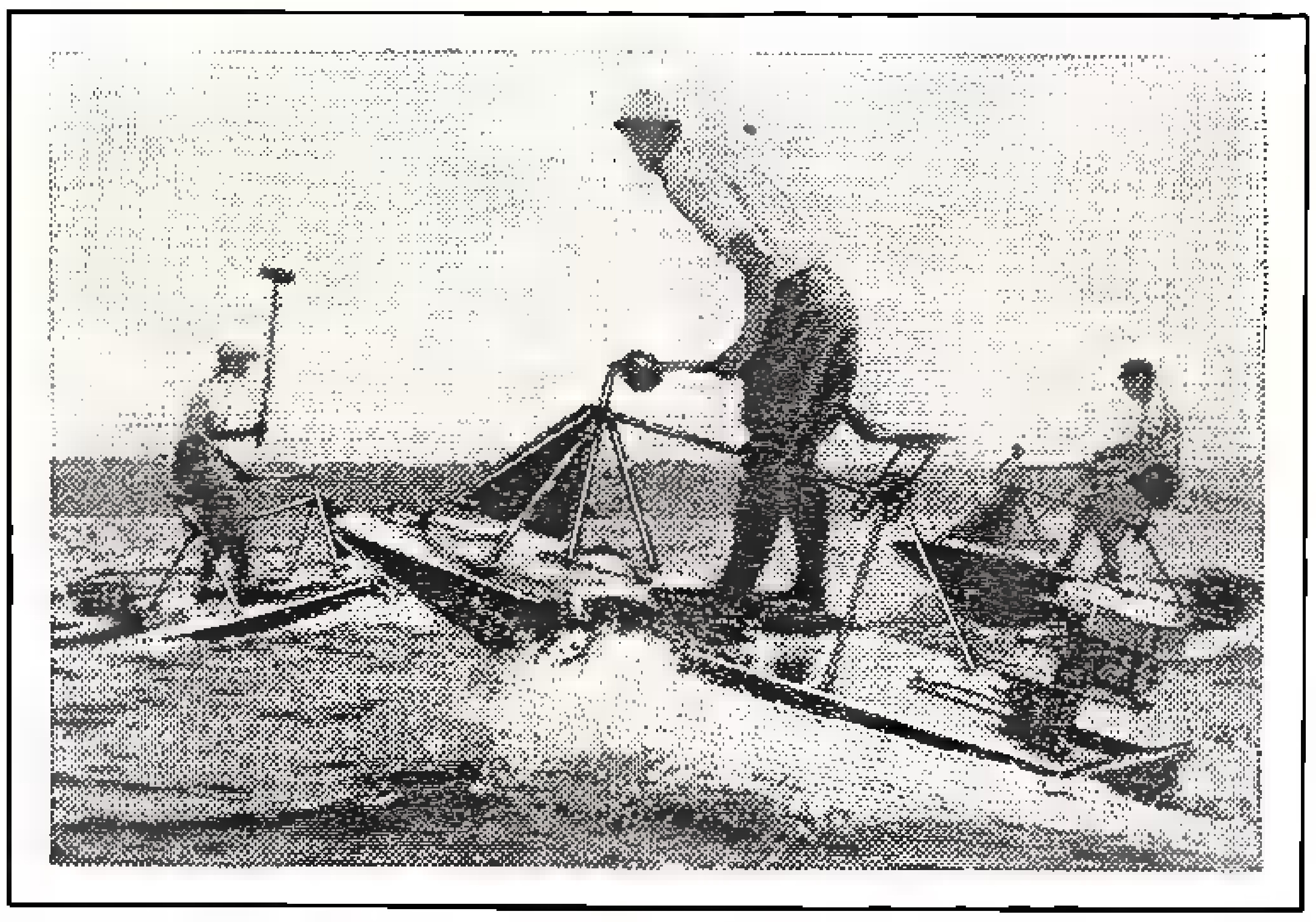
THE second negro in medical history to turn entirely white has been reported to the American Medical Association. In a case of rash which he contracted seventeen years ago, white spots appeared on his skin which have since spread until they covered his entire body.

Young Champs Stage Own Race

ONE of the high points of interest in the preliminaries of the recent Indianapolis speed classic was a display of automotive talents by the younger generation.

They are seen preparing to strut their stuff in the photo below. The midget racing cars are demotorized, power being furnished by a pusher bringing up the rear. The young speed demons, who will be the racing champs of tomorrow, get all the thrills of the speedway heroes they are emulating.

Polo Has Mechanical Mounts



Water sport—water polo—played on pontoon "mounts."

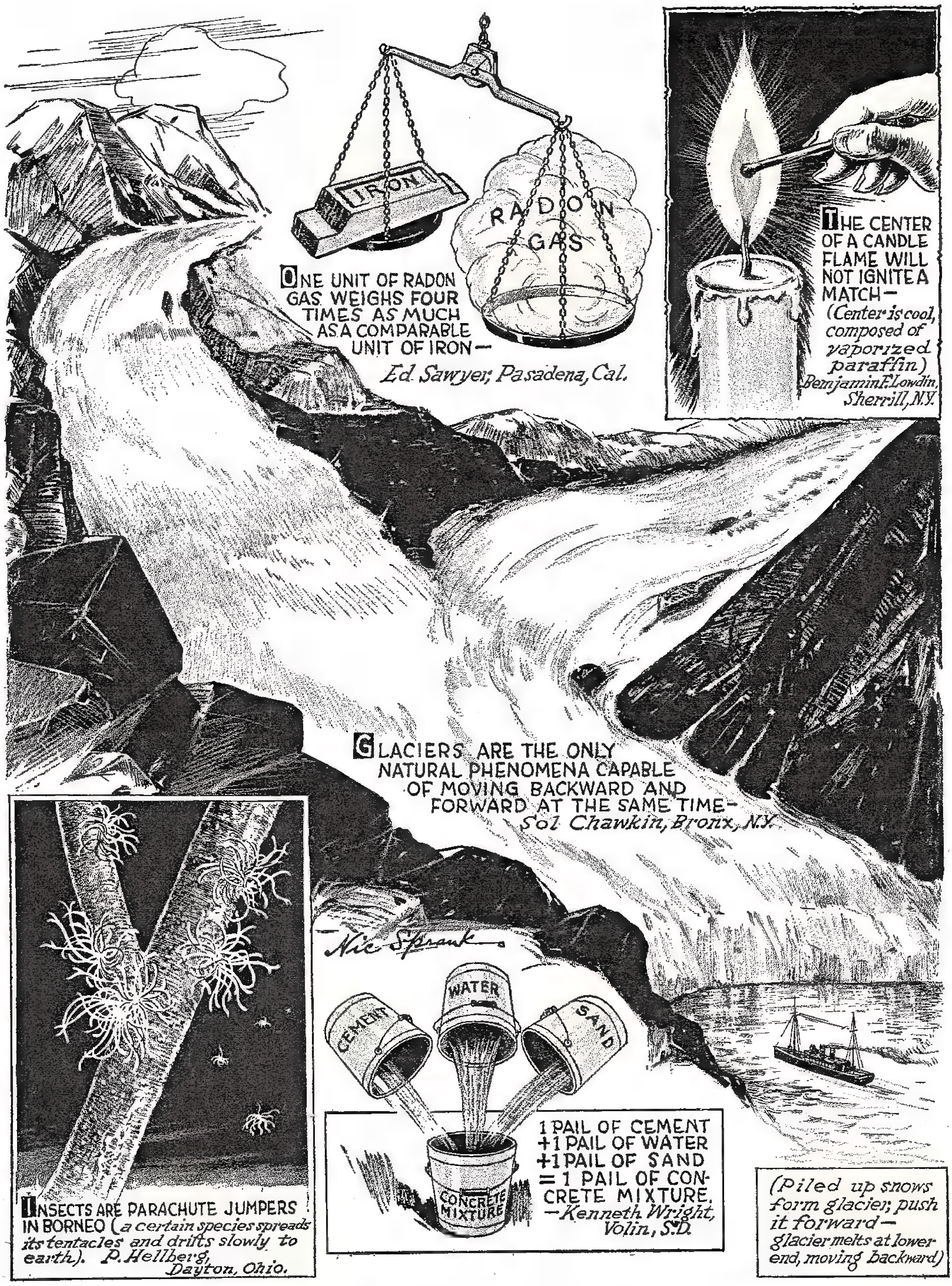
WATER sportsmen are never lacking in ingenuity. Their latest creation is "water polo," played on motor-driven pontoons. Their "mounts" have a framework like a bike, except the steering mechanism, which is a single lever affair, as seen above.

GRAND STAND
C

Budding speed demons lined up for start of race over speedway. "Motor" is pusher bringing up rear on end of stick.

Oddities of SCIENCE

by NIC SPRANK



ONE UNIT OF RADON GAS WEIGHS FOUR TIMES AS MUCH AS A COMPARABLE UNIT OF IRON—
Ed Sawyer, Pasadena, Cal.

THE CENTER OF A CANDLE FLAME WILL NOT IGNITE A MATCH— *(Center is cool, composed of vaporized paraffin)*
Benjamin F. Lowdin, Sherrill, N.Y.

GLACIERS ARE THE ONLY NATURAL PHENOMENA CAPABLE OF MOVING BACKWARD AND FORWARD AT THE SAME TIME—
Sol Chawkin, Bronx, N.Y.

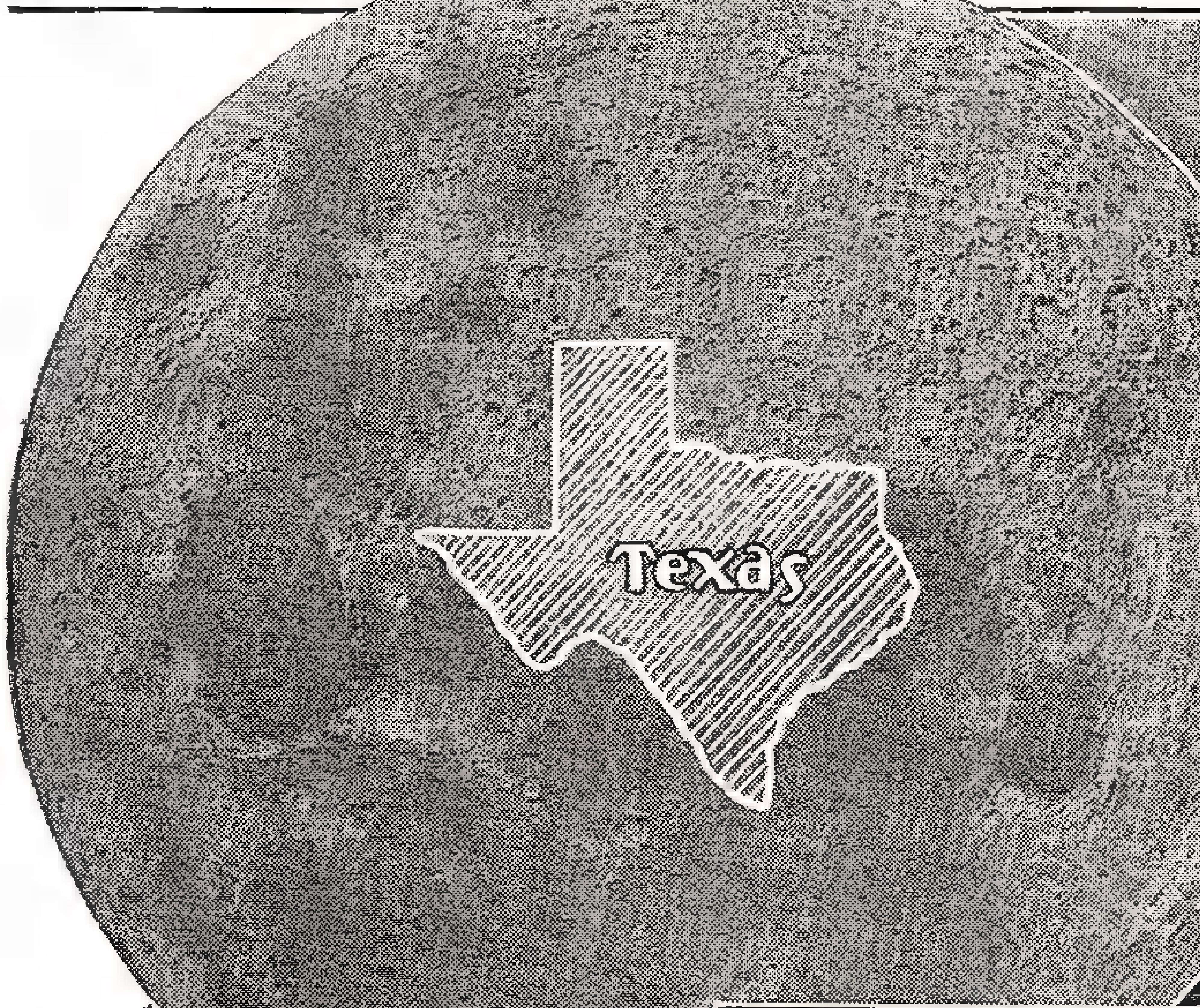
(Piled up snows form glacier; push it forward—glacier melts at lower end, moving backward)

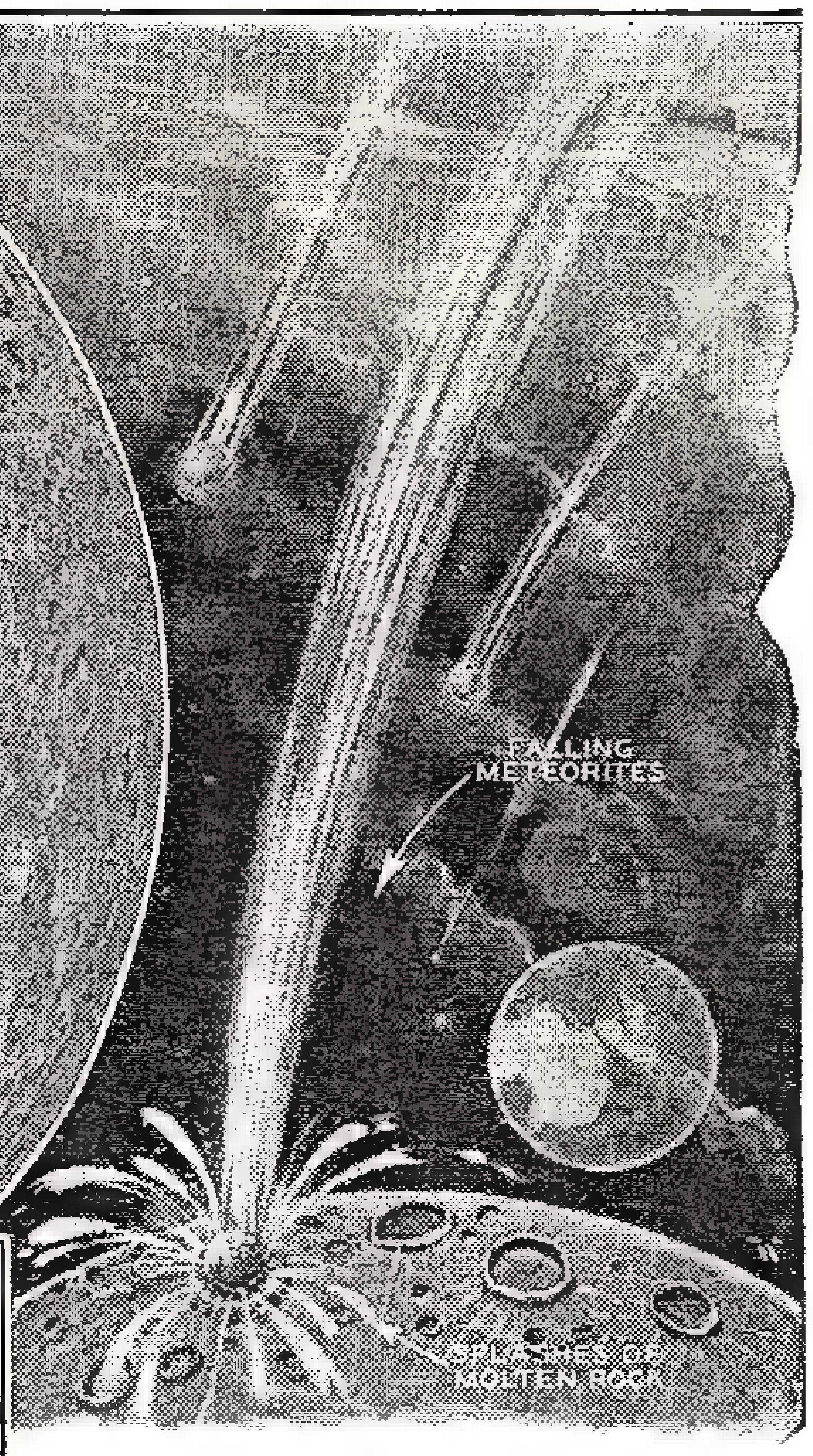
INSECTS ARE PARACHUTE JUMPERS IN BORNEO *(a certain species spreads its tentacles and drifts slowly to earth).* *P. Hellberg, Dayton, Ohio.*

1 PAIL OF CEMENT
+1 PAIL OF WATER
+1 PAIL OF SAND
= 1 PAIL OF CONCRETE MIXTURE.
—Kenneth Wright, Volin, S.D.

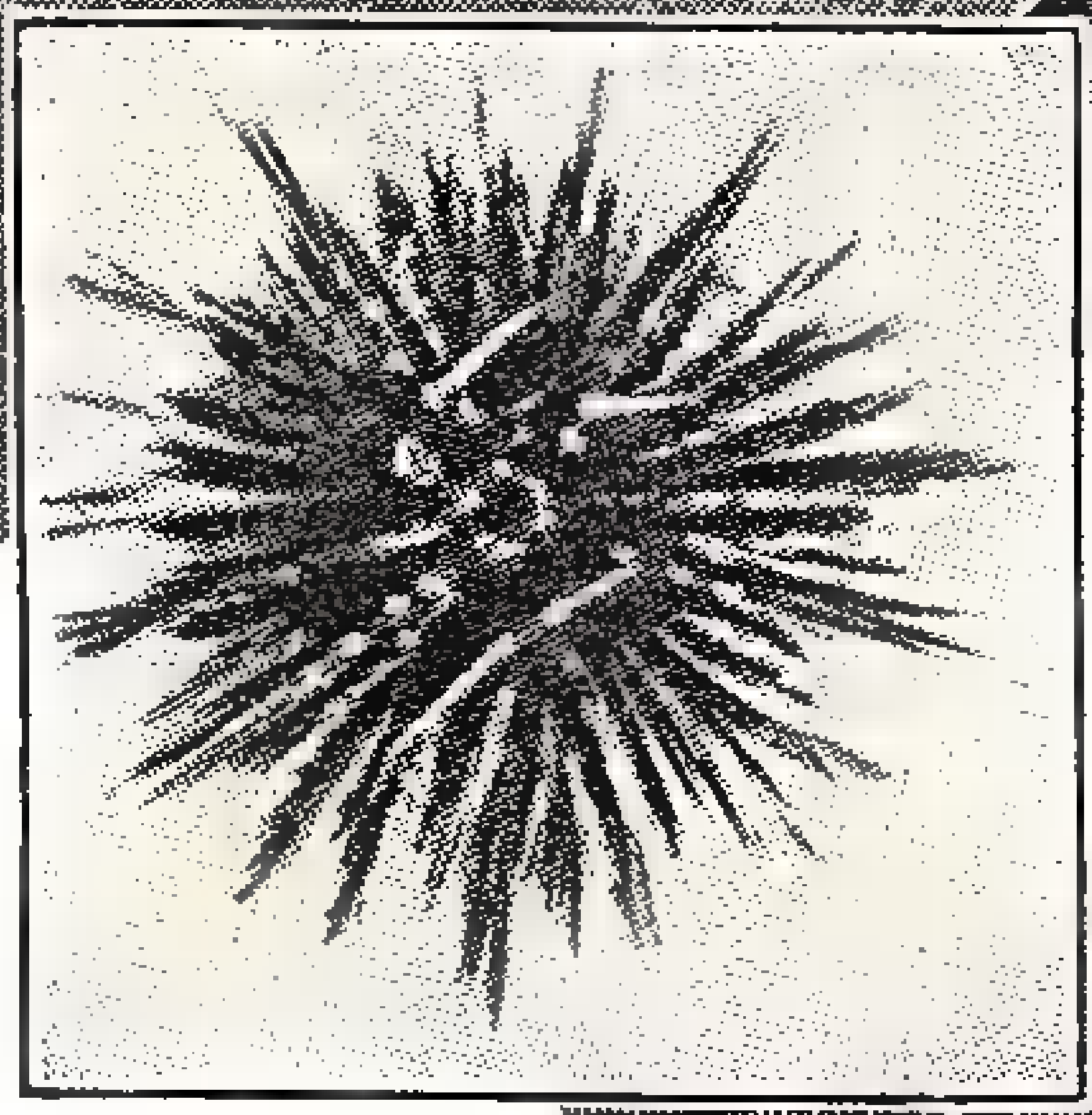
ONE DOLLAR will be paid by Nic Sprank for oddities of science used on this page. Send in your ideas—no limit to the number of suggestions you may make, but be sure to enclose proof of your statements. Maybe your ideas will be better than those shown on this page—if they are, Nic Sprank wants them and will be glad to send you a check. Address suggestions to Nic Sprank, care of Modern Mechanix and Inventions, 529 South Seventh Street, Minneapolis, Minn.

GETTING *More* LIGHT





Some astronomers believe that giant lunar craters were created by terrific impact of meteorites striking the surface, digging huge pits, as illustrated here.



Moon's diameter, 2,160 miles, may be vividly perceived by this comparison of lunar area with area of Texas. Right is seen a sea urchin, inhabitant of Red Sea, which spawns only when moon is full. Scientists are now trying to determine whether moon is responsible for this periodicity of reproduction.

IT IS unwise to dogmatize about the future, and hence a cautious man of science would hardly make the positive assertion that human beings will never visit the moon, though the difficulties involved in such a journey now appear insuperable.

On the other hand it is quite safe to assert that, without leaving his own planet, man will learn much more about the earth's satellite in days to come than he knows today. This expectation is based upon the remarkable progress accomplished in the study of the moon in recent years.

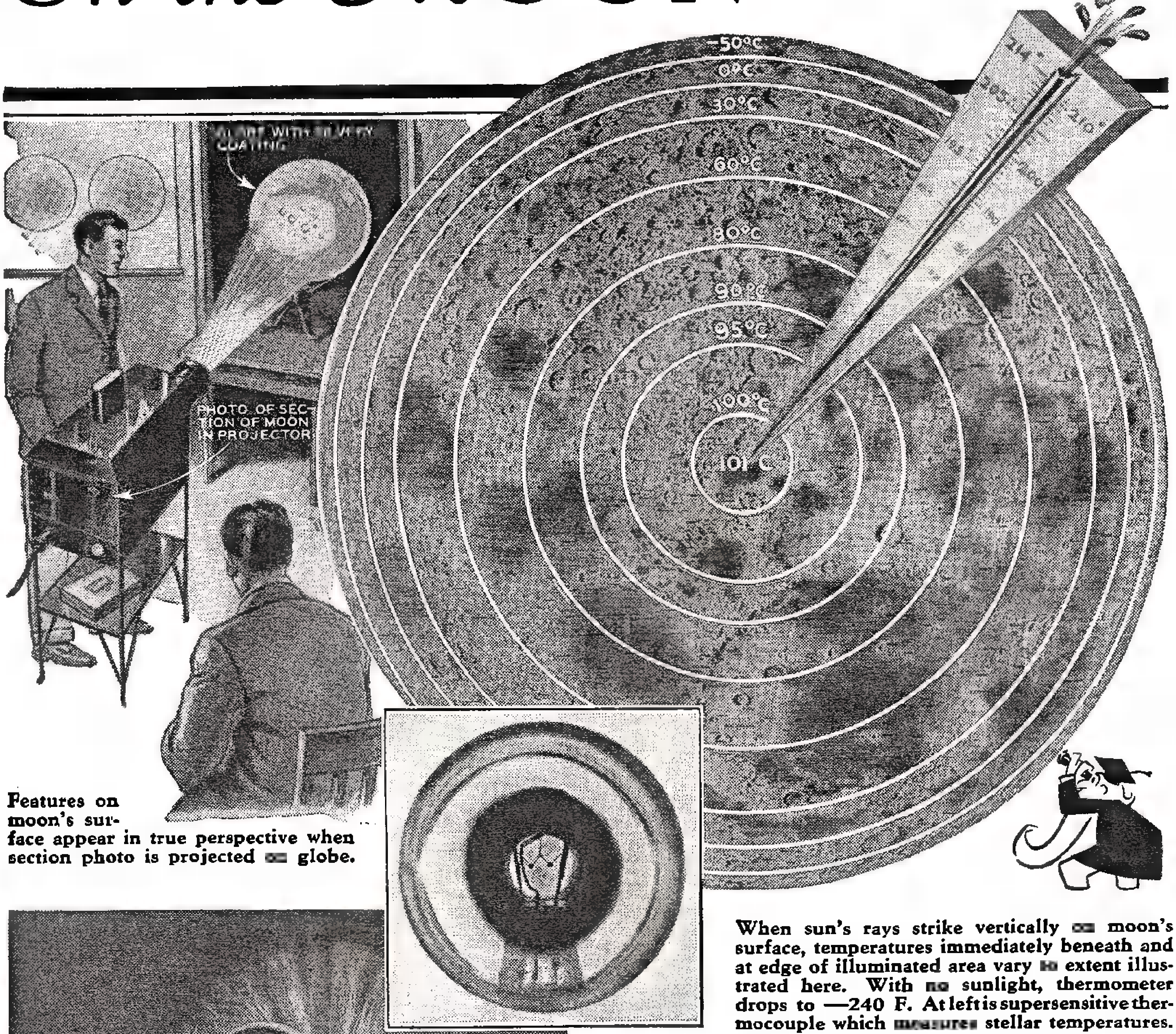
Here are a few achievements that would have seemed utterly and forever impossible to astronomers of a century ago:

It has long been realized that the lunar surface must get intensely hot during the long lunar day and intensely cold during the long lunar night, as the moon has no atmosphere—or none to speak of—to temper and conserve the heat of the sun's rays. Science could only speculate, however, about lunar temperatures until a recently invented instrument, the vacuum thermocouple, was attached to the big 100-

Lines radiating from these craters, scientists believe, are streaks of molten rock that splashed out when monster meteorites collided with the moon. Entire surface of moon is spotted with these exceptionally large craters, similar to one in Winslow, Arizona.

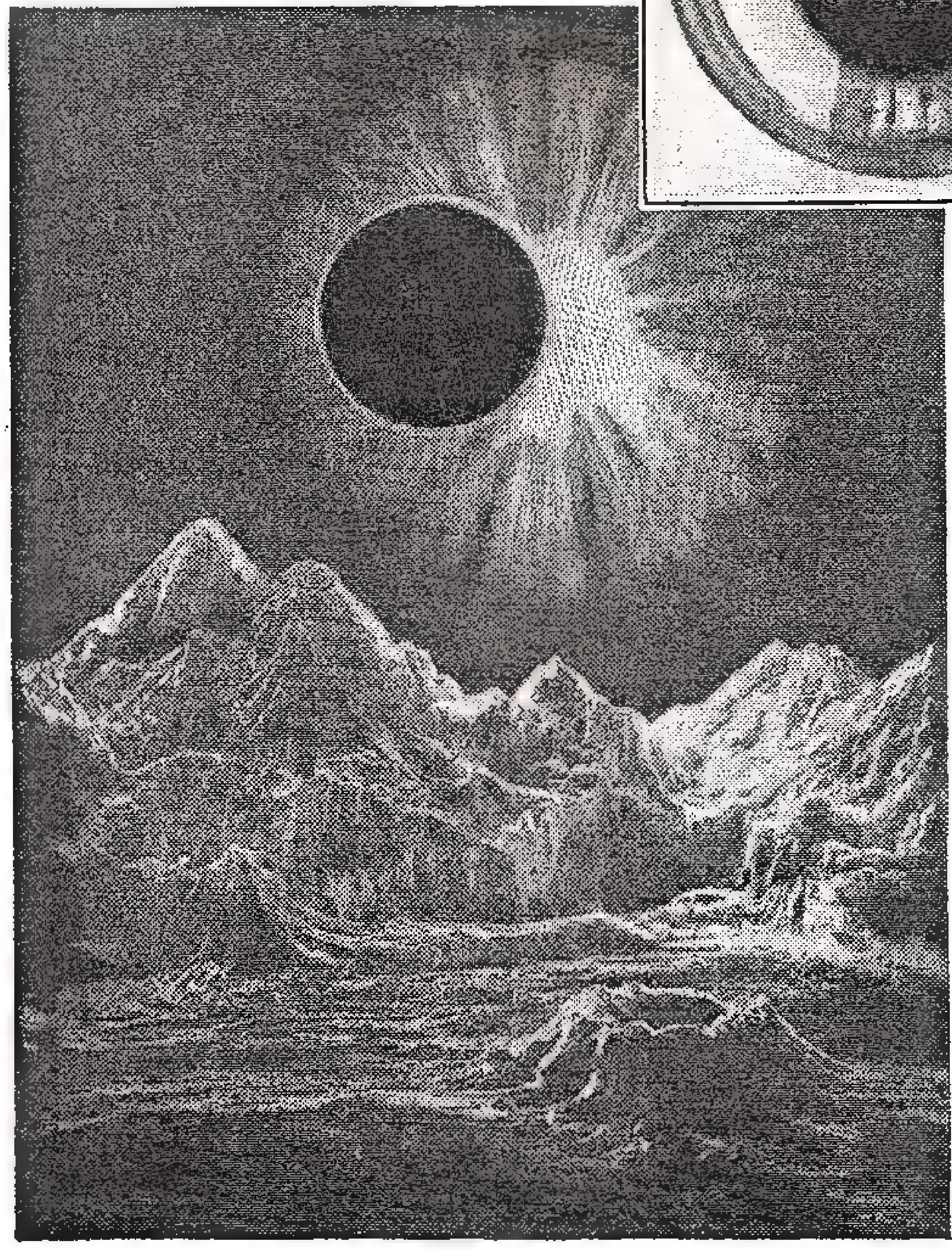
On the MOON

by CALVIN FRAZER



Features on moon's surface appear in true perspective when section photo is projected on globe.

When sun's rays strike vertically on moon's surface, temperatures immediately beneath and at edge of illuminated area vary to extent illustrated here. With no sunlight, thermometer drops to —240 F. At left is supersensitive thermocouple which measures stellar temperatures.



This remarkable drawing shows you just how an eclipse of the earth would appear to an inhabitant of the moon.

inch telescope at Mount Wilson Observatory and applied to the actual measurement of these temperatures from point to point on the surface of the moon.

These measurements show that wherever the sun's rays fall vertically upon the moon the surface becomes a little hotter than boiling water, while at the edge of the illuminated area the surface is nearly as cold as liquid air. When the solar rays are withdrawn during the lunar night, which is half a month long, the surface gets colder and colder until its temperature is probably as low as 240 degrees below zero Fahrenheit.

A range of about 450 degrees between midday and midnight is one of the reasons why human visits to the moon are apparently impossible!

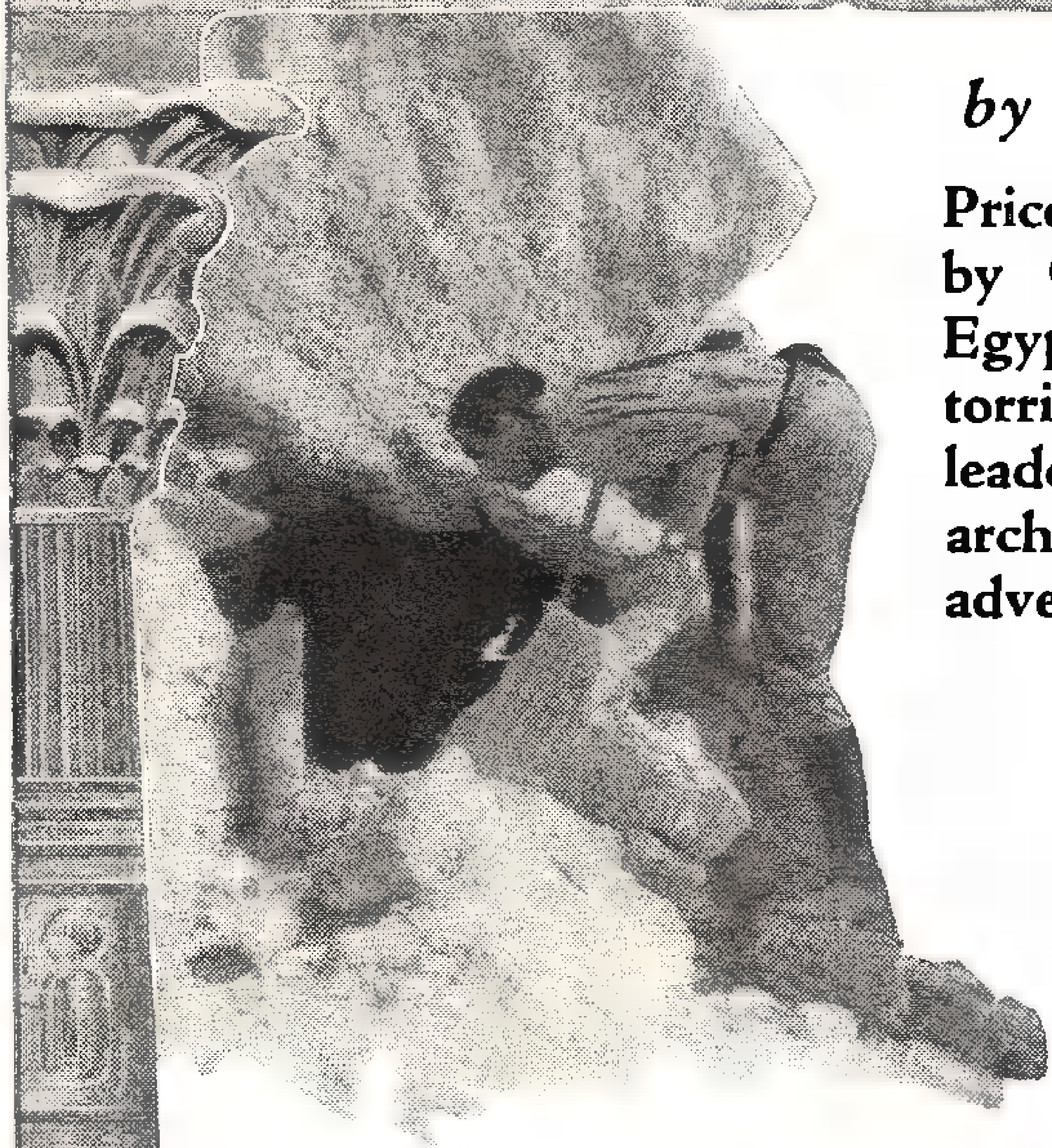
Though bygone astronomers did not believe the moon to be made of green cheese, they did not know, as we do today, that the surface material must consist mainly of some material similar to volcanic ash or pumice. This has been proved by Prof.

(Continued on page 22)

FINDING CLEOPATRA'S

by COUNT BYRON de PROROK

Priceless jewels worn twenty centuries ago by Cleopatra, vampire queen of ancient Egypt, have at last been found deep in the torrid, sandy wastes of the Sahara. Here the leader of the intrepid expedition, famous archaeological explorer, tells of the amazing adventures he met with on the perilous quest.



Count de Prorok peering into subterranean chamber, unvisited for 20 centuries, in which he discovered priceless emeralds of Cleopatra.

FOR twenty centuries amazing tales of the legendary emeralds of Cleopatra, supposed to be buried somewhere in the desert sands, have intrigued the imaginations of adventurers, sent them wandering over burning deserts, lured by the quest of fabled jewels once worn by the most romantic woman of all history — jewels which Antony may have given her, which she may have worn in those fabled scenes of history that have come down to us as the most glamorous of legends.

This much was fable, but was there any basis to the legend? In years of exploration in desert regions, I had heard this whispered tale a thousand times, hardly daring to believe, or to hope that I might find them.

But I have!

In a mysterious cavern on the heights outside the desolate city of Garama I came to the end of my long hazardous quest for the hidden jewels. There after two years of scouring the torrid desert, I ended an adventure that had included skirmishes with wild desert tribesmen, tortuous treks over thousands of miles of sandy wastes, and discoveries of cities long lost to civilization.

While the expedition worked among the ruins of the old Garamante city, I explored the neighboring territory, and came upon the dark mouth of a cave which, my guide pointed out, held the possibility of containing the long-lost gems. Ancient symbols carved on the rocks gave me the first token of my quarry.

Torch in hand I crawled into the narrow opening, and after moving forward a few

FABLED EMERALDS

yards, found I could stand upright. About me lay a strange breath-taking scene. The flickering light of my torch threw grotesque shadows on the walls, revealing rows of ancient hieroglyphics.

In the dim light I stumbled upon the remains of old household utensils and implements of war—swords, arrows, spears. Down in the midst of these objects I spied a dust-encrusted bundle wrapped in a winding sheet. I prodded it with my stick and it fell open—rotten with age. But as I thrust about seeking to determine its contents, an amazing scene greeted my eyes. There among some bits of broken pottery lay the object of my quest—a handful of deep-green stones. It is difficult to describe my joy as I examined these relics of antiquity and realized that I was holding ornaments that once bedecked the person of the famous vampire queen of Egypt.

To make sure that I had found the gems I was seeking, I compared them with several emeralds I was carrying that I had taken a few years previously from a beautiful necklace I dug out of the ruins of Cleopatra's summer palace at Merza Matruh, where she and Antony had spent their last hours together. The Merza Matruh stones were of the same quality of the ones I had just found, so I knew I had found the long-sought emeralds.

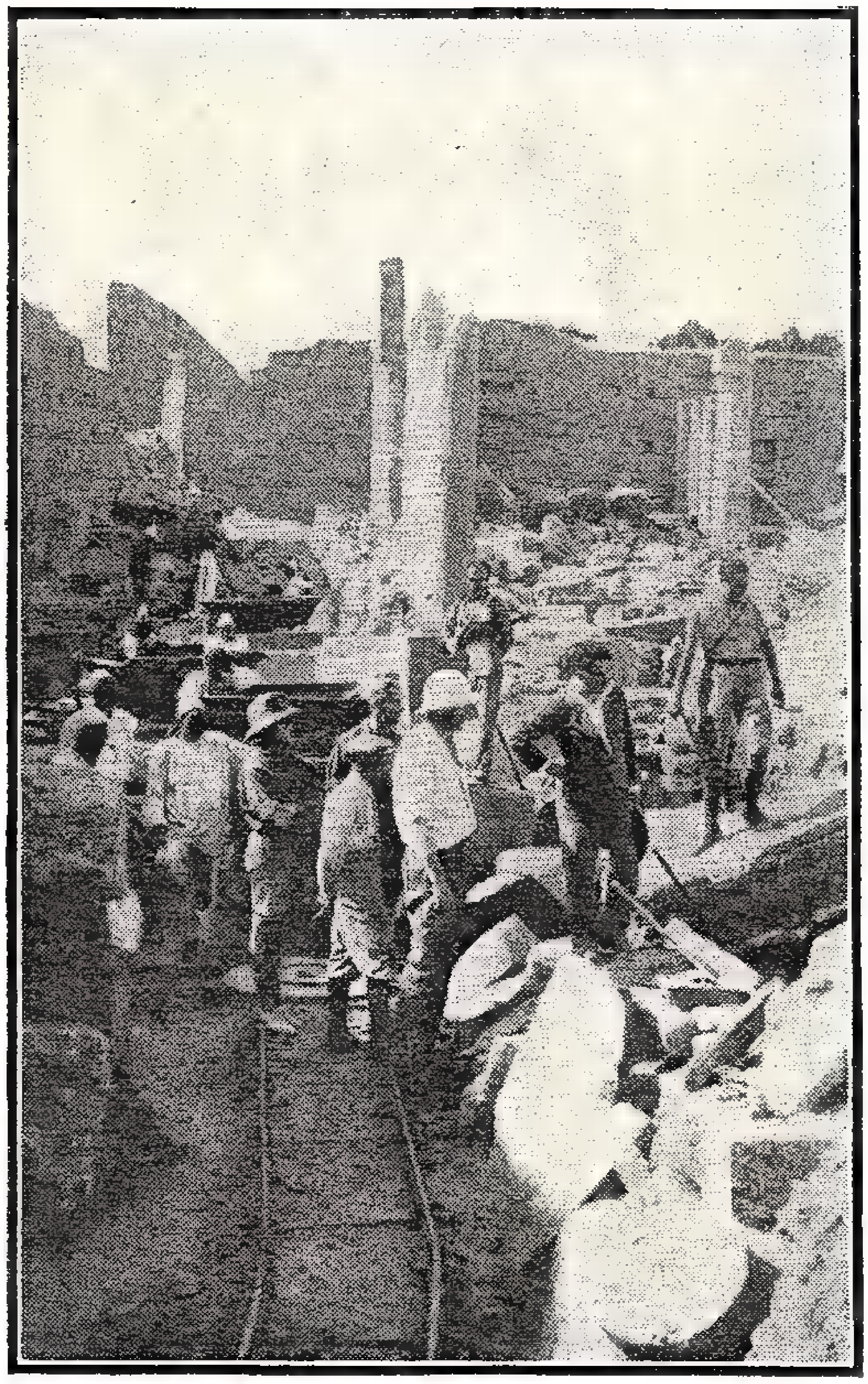
How my expedition, made under the auspices of the Italian Government, toiled over the barren wastes of Africa's Sahara, makes a thrilling story.

Ever since I first visited Africa I had been hearing weird stories about the mysterious emeralds of Cleopatra, reputed to be of fabulous value, from divers historical and native sources. It appeared that most of these stories, originally told by the ancient Egyptian, Roman and Cathaginian nobles, were still being told in the city of Ghat, far South in the desert, once the great slave center of the Sahara.

With Premier Mussolini's personal permission I was able to lead the first scientific expedition across the newly conquered Italian Libya to this legendary city of Ghat. Our personnel was composed of 18 men, including ten moving picture men — mechanics, students and specialists — as well as two Arab guides. Our caravan, while it included a number of well-trained camels to be used for short trips, consisted mostly of six especially constructed French Delahaye

Count de Prorok on his favorite camel on which he explored the mysterious regions of the Libyan desert. Below—the Prorok expedition camps in the ruins of Leptis Magna, a city founded centuries ago by the great Emperor Septimius Severus. The explorers are enjoying that rare luxury of the desert—a bath and a shave.

Expedition Penetrates 2,000 Miles Into Sahara in Search of Emeralds



Members of Prorok expedition unearthing ruins of Leptis Magna. Note the tall stone pillars which supported roofs of the great houses of the nobles of the famous city.

trucks. After months of preparation our truck section of the expedition left Tripoli and penetrated into the desert, escorted for many miles by a section of the Italian Colonial army.

No mere words can adequately describe our sensations when, after a week of the most heart-breaking struggles over towering sand dunes, ravines, veritable mountains of rock and cactus and dried up river courses, we blazed and blasted our way through to the "Dead City of Ghirza." With perhaps a hint of pride that I hope is pardonable, may I point out that this was the first time in history that this legendary city had ever been visited by automobile?

We could see for two days its weird, unearthly shape, outlined tantalizingly on the horizon—so clear, so near in the sun-parched desert—and yet, so far.

Imagine a dead city in majestic ruins, rising out of the sands, hundreds of miles from the nearest Arab village. Without life or trees, or even known history—veritably a masterpiece of desolation and decay.

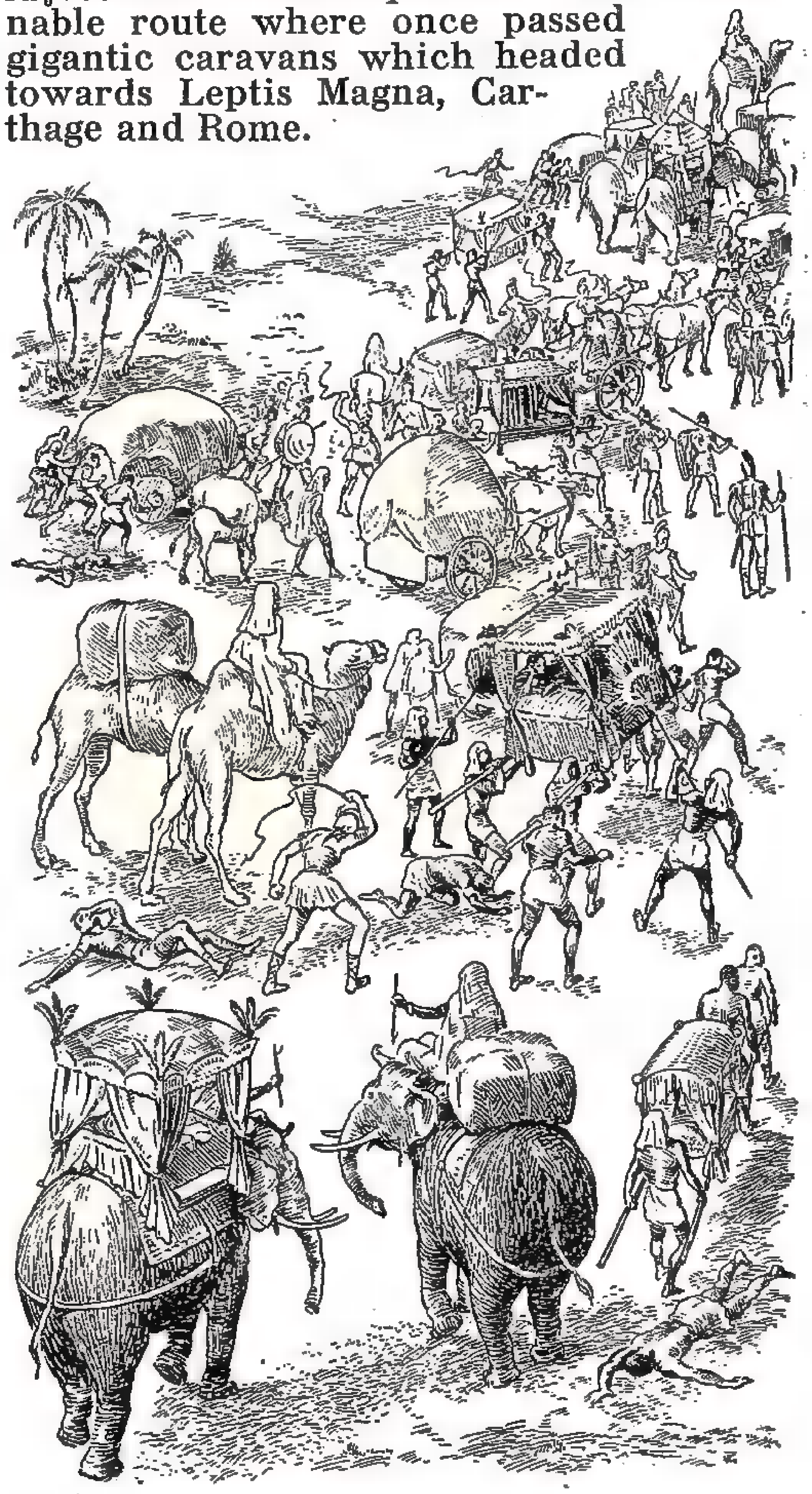
Truly this 25 century old city is a saddening sight today. The city does not exist any more as a living thing. Through its well laid passageways which cost untold wealth to build and countless men to devise, never a living creature penetrates, except for skulking jackals and vultures who break the silence where once marched an empire.

For days we explored this most stupendous of all the Sahara's half-buried cities, and in one tomb we found several magnificent emeralds. Whence did they come? From the South? Possibly so. Ever further south we blazed our way.

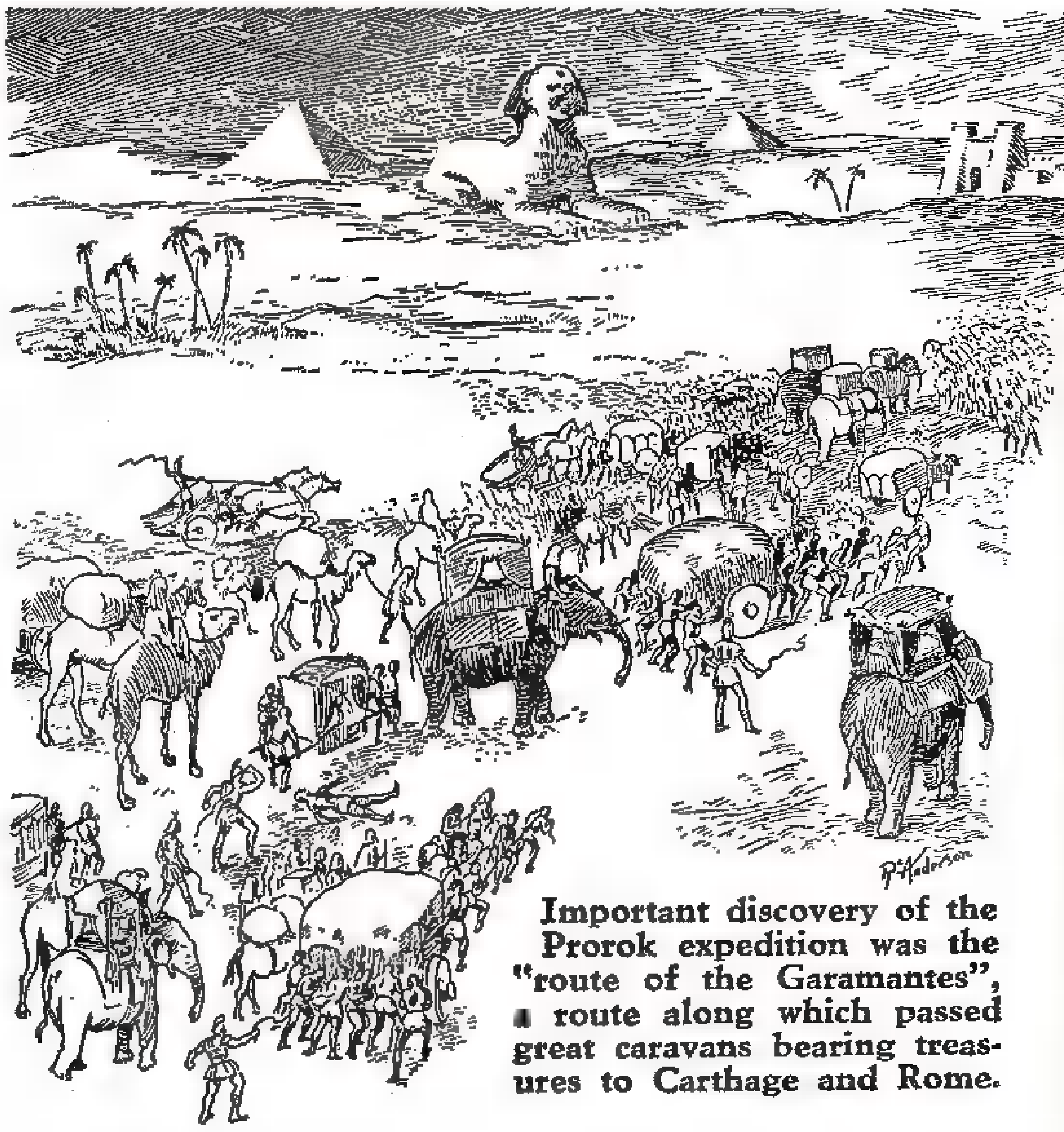
Our objective now was Garama, the most southernmost Roman ruin in the world.

Not long after departing from Ghirza, having now pushed deep into the desert wastes, we suddenly came upon many important Libyan and Roman inscriptions. These indicated, to my very great joy, that we had actually stumbled upon the ancient route which had been utilized at least 20 centuries ago by the Carthaginians and Romans to penetrate the heart of black Africa.

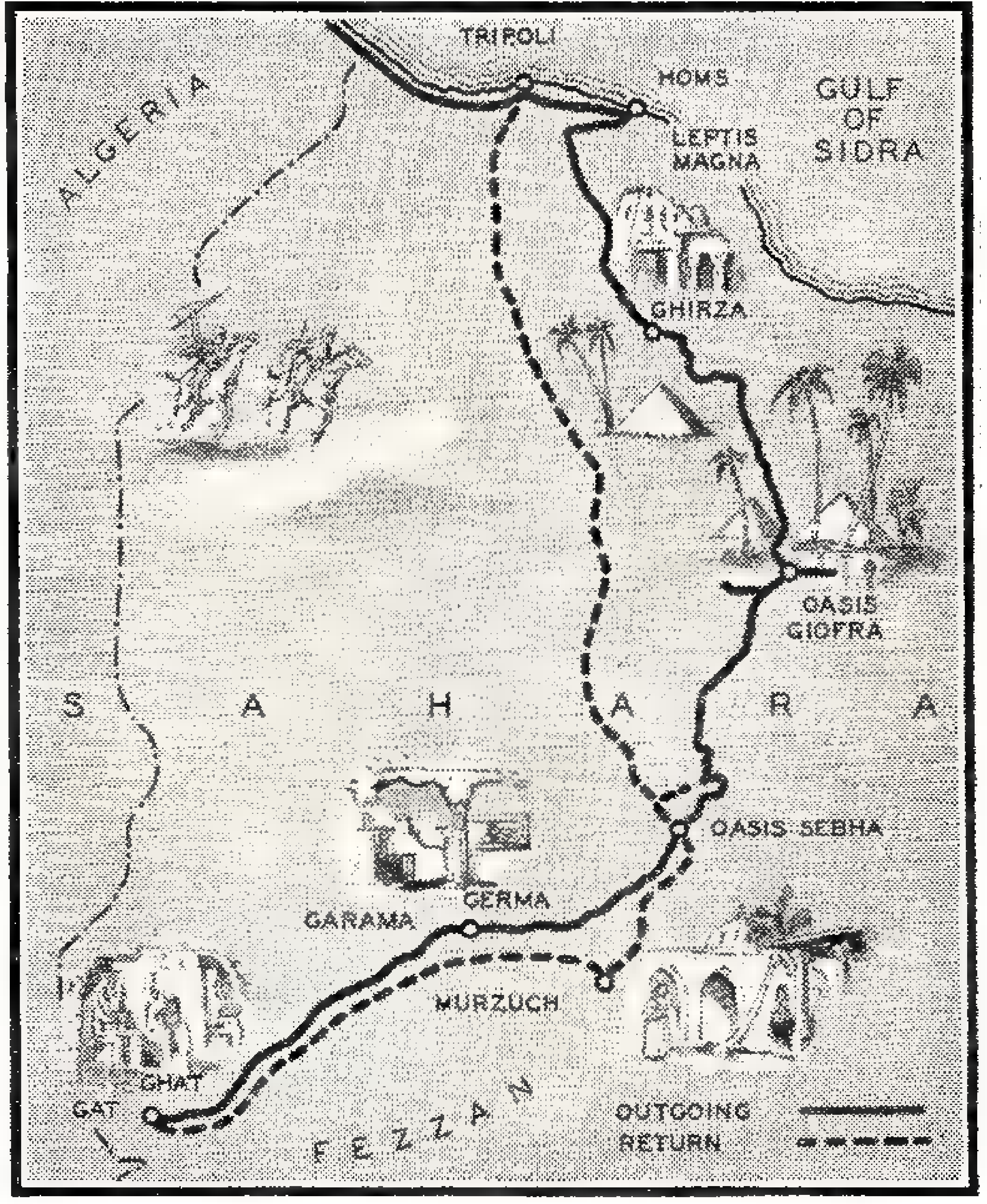
I hardly need say that our imaginations were inspired at finding again this ancient 'route of the Garamantes," one of the major objectives of the expedition—an interminable route where once passed gigantic caravans which headed towards Leptis Magna, Carthage and Rome.



Find Ancient Caravan Route Where Thousands of Slaves Died of Thirst



Important discovery of the Prorok expedition was the "route of the Garamantes", a route along which passed great caravans bearing treasures to Carthage and Rome.



Here is seen the route traveled by the Prorok expedition into the Sahara. Cleopatra's emeralds were discovered outside the city of Garama, abandoned for many centuries.

There were troops of gaudily arrayed elephants, cargoes of ivory and powdered gold; chariots drawn by buffalos transporting famous gems of the Garamantes and treasures of Ethiopia for royalty like Cleopatra and Messalina (third wife of the Roman Emperor Claudius). This was indeed a death-dealing journey—one in which thousands of slaves perished of hunger and thirst, en route to the markets of Rome, Carthage and Alexandria.

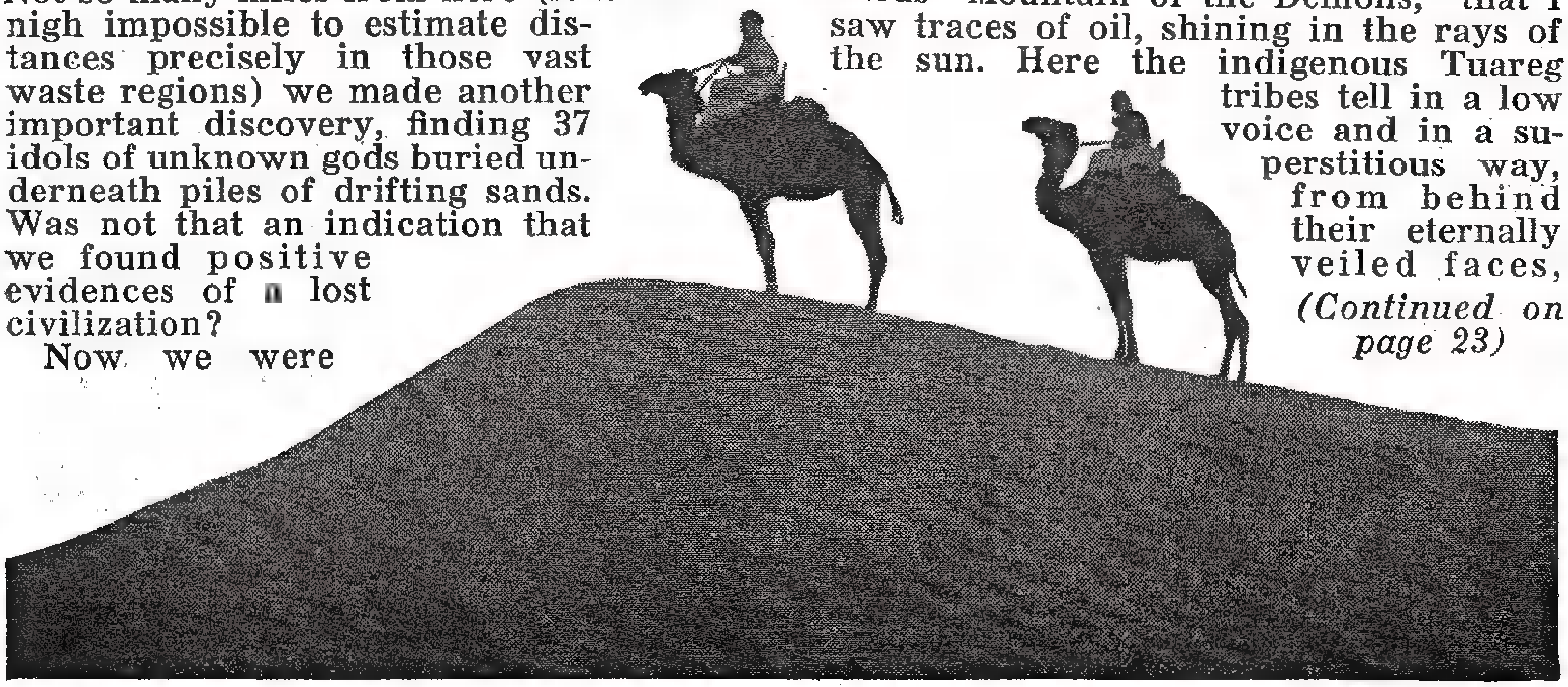
From time to time along our wearisome march we found mummified remains of these caravans — gruesome proof of the havoc burning sands can wreak. Some day, perhaps, I hope to achieve what others have been aiming towards for centuries—discover the vestiges of the army of the Persian king, Cambyses, who was buried under a tempest of sand while marching towards the oasis of Jupiter Ammon.

Meantime we continued our march ever towards the South, passing by Oeddan. Not so many miles from here (it is well nigh impossible to estimate distances precisely in those vast waste regions) we made another important discovery, finding 37 idols of unknown gods buried underneath piles of drifting sands. Was not that an indication that we found positive evidences of a lost civilization?

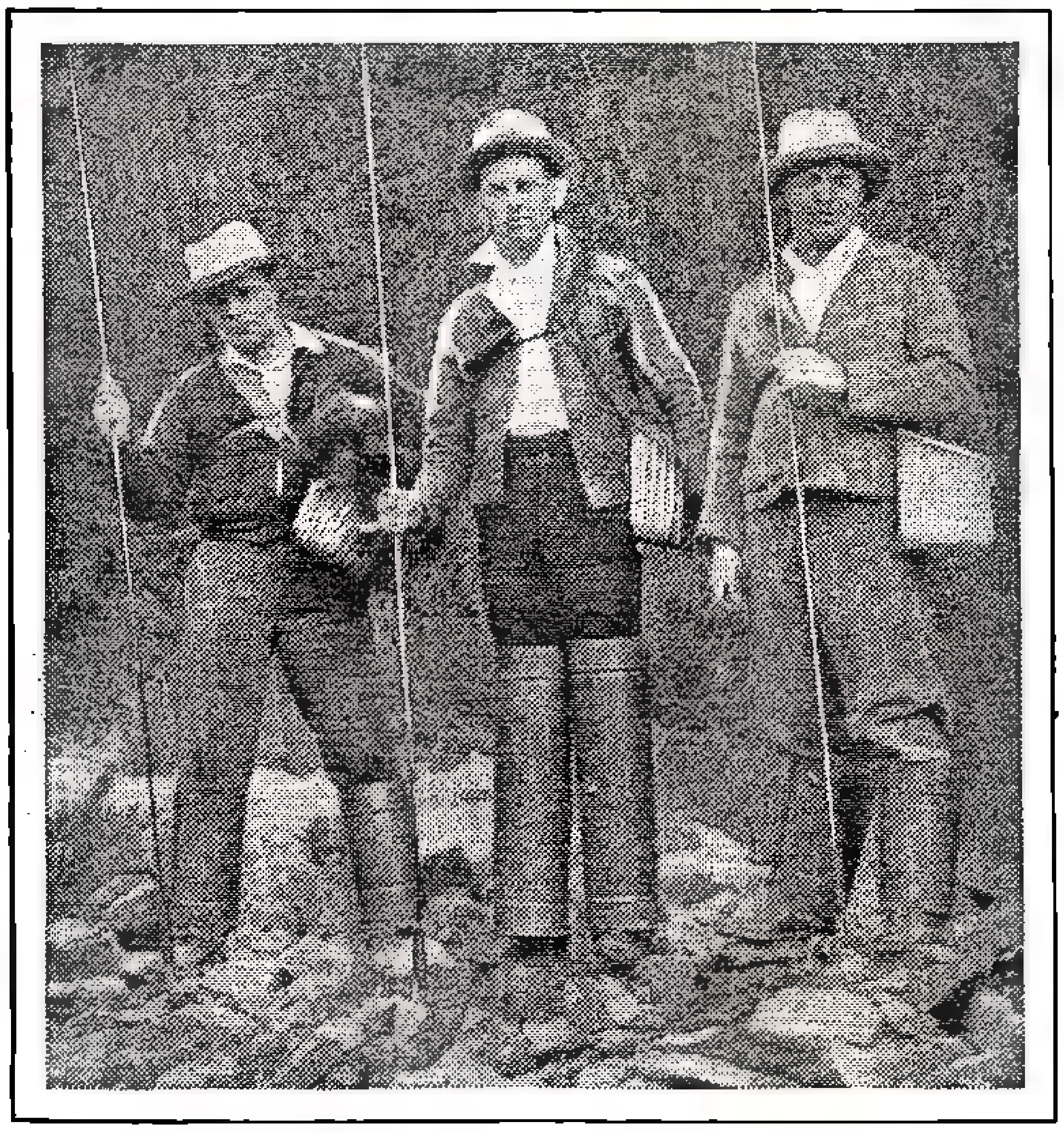
Now we were finally at Ghat, the famous sacred city, half buried in the Sahara, oftentimes spoken of as the "city of slaves" because of its ancient claim to this title. We were the first scientific expedition to reach this long-sought goal of archaeologists. Along with Kufra and Timbuctoo, for a hundred years this city has been the explorer's dream of Paradise.

It was in the environs of Ghat, near the famous "Mountain of the Demons," that I saw traces of oil, shining in the rays of the sun. Here the indigenous Tuareg tribes tell in a low voice and in a superstitious way, from behind their eternally veiled faces,

(Continued on page 23)



Stove Pipe Armorplates Legs Against Rattlesnake's Fangs



Lengths of stove pipe worn over legs protect fishermen against deadly fangs of rattlesnakes lurking among rocks.

SOMETHING new in fishing equipment is armor-plated legs. The armor plate in the case illustrated in the accompanying photo is not exactly bullet-proof, but it does stay the deadly fangs of rattlesnakes that lurk among the rocks on the edge of the fishing stream.

The stunt was introduced by three Oregon men who were not going to be kept from their trout by mere snakes. Lengths of stove pipe worn over the lower leg render the lunges of angered rattlesnakes harmless, and fishing goes on unhampered.

To Bed at 8, Up at 3 for Health

THE old proverb stating that one hour's sleep before midnight is worth two hours' sleep afterwards is confirmed by tests conducted by a German scientist. Subjects improved in health when they went to bed at eight and rose at three in morning.

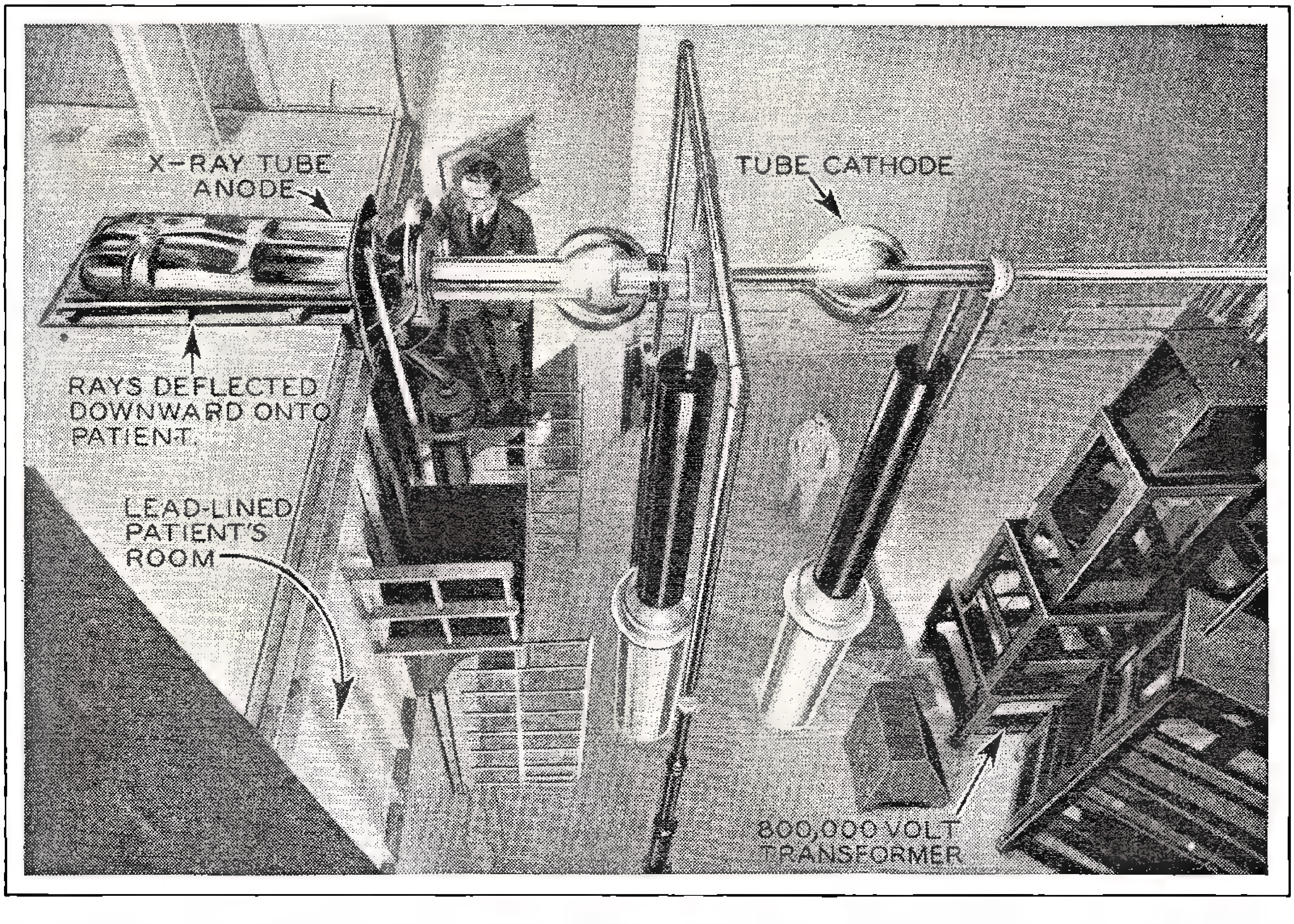
Largest X-ray Tube Fights Cancer

MARKING a notable advance in the battle of medical science against cancer, the Mercy Hospital Institute of Radiation Therapy in Chicago has installed a new 800,000-volt X-ray tube, which, it is claimed, furnishes an economic solution to the treatment of the dread disease.

The most powerful X-ray tube ever put into practical use, the apparatus is expected to be especially effective in treating large, massive and deep-seated cancers.

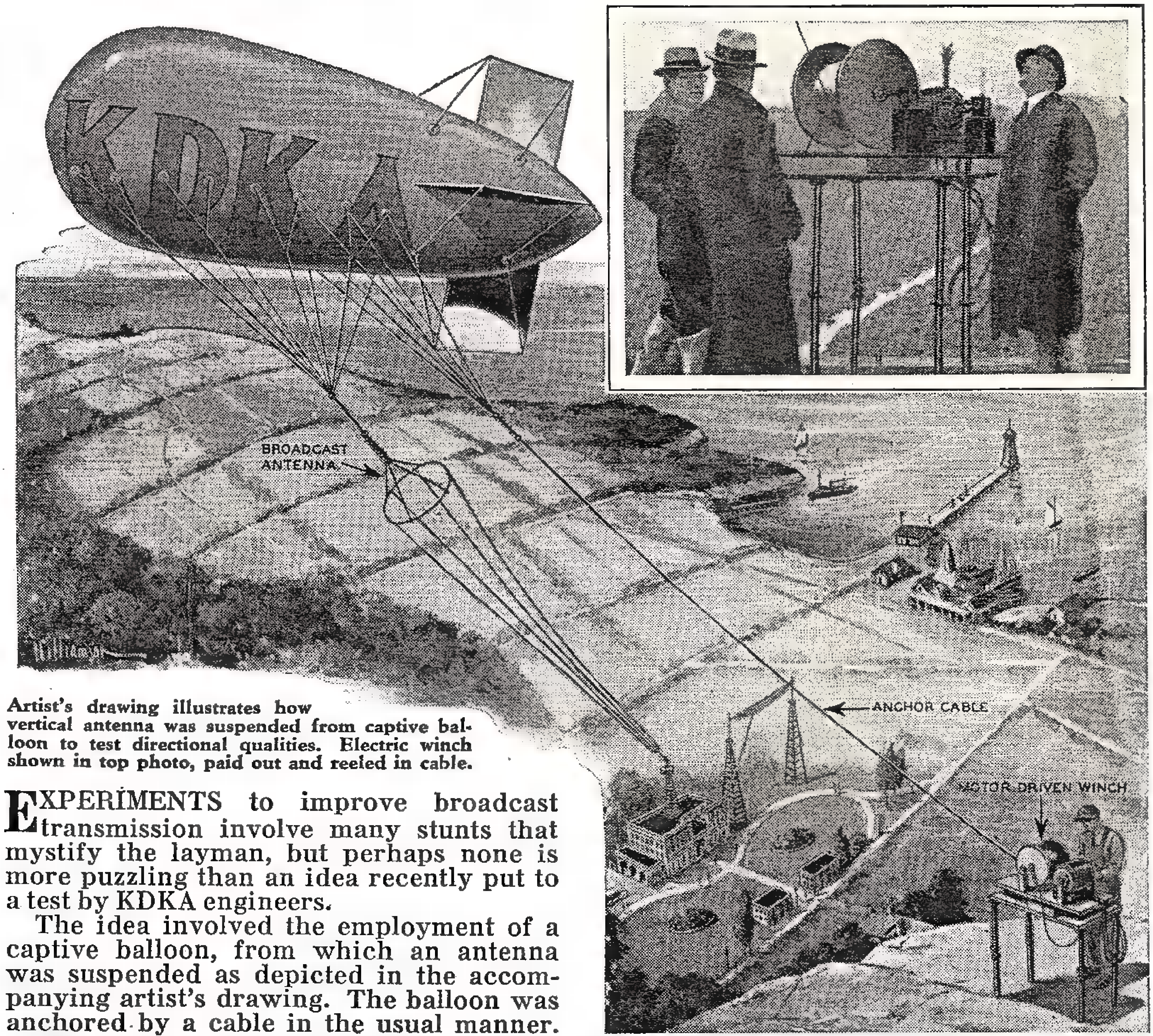
Radiations emitted by the tube are equal in quality to radiations from $75,000,000 worth of radium, so that X-ray equipment to care for a given number of people will cost only one-sixth as much as radium required for the job.

The giant tube is 14 feet long and composed of two sections.


X-RAY TUBE ANODE
TUBE CATHODE
RAYS DEFLECTED DOWNWARD ONTO PATIENT.
LEAD-LINED PATIENT'S ROOM
800,000 VOLT TRANSFORMER

The 800,000-volt X-ray tube at Mercy Hospital, Chicago. Tube emits radiations of $75,000,000 worth of radium.

Balloon is "Sky Hook" in Radio Aerial Test



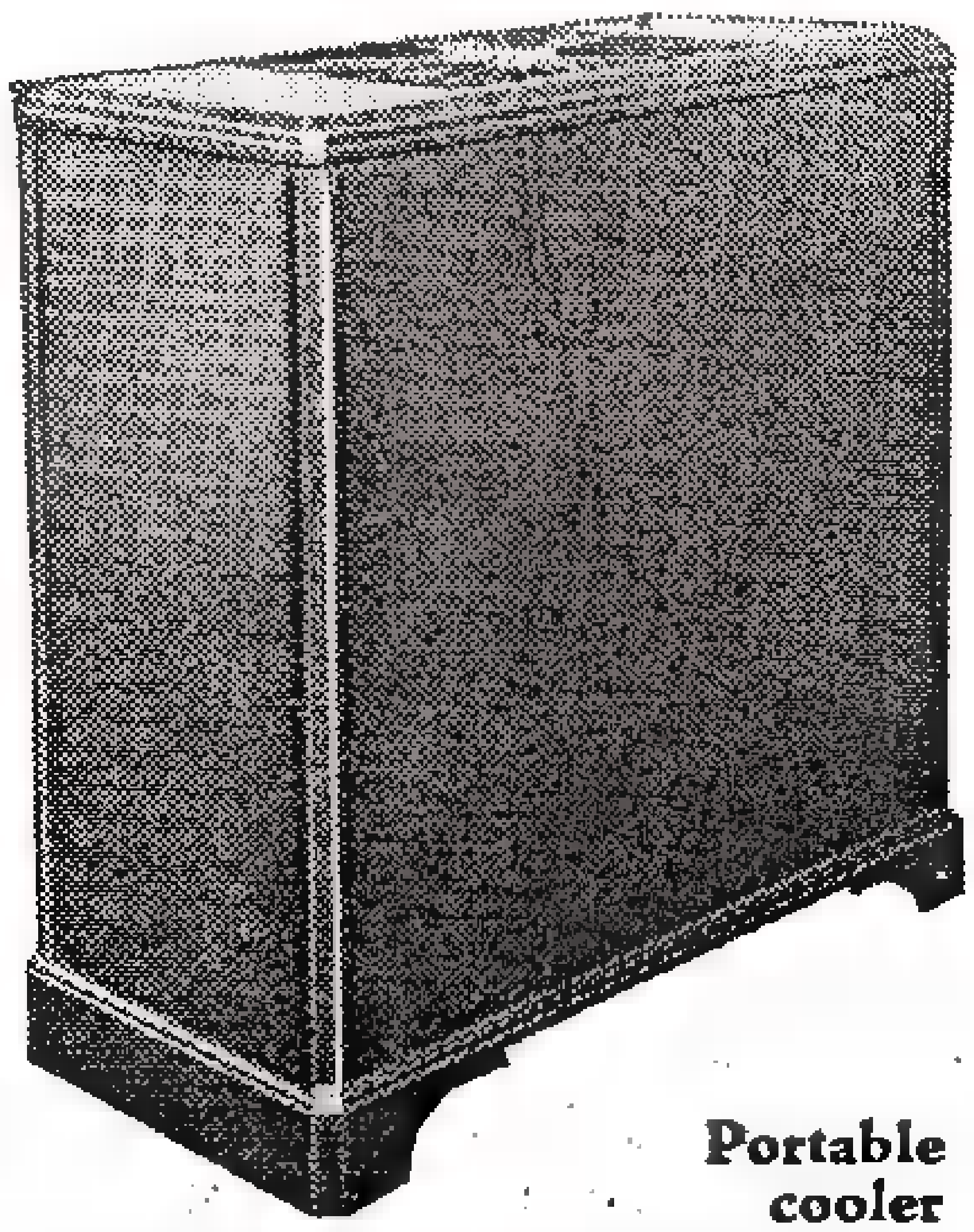
Artist's drawing illustrates how vertical antenna was suspended from captive balloon to test directional qualities. Electric winch shown in top photo, paid out and reeled in cable.

EXPERIMENTS to improve broadcast transmission involve many stunts that mystify the layman, but perhaps none is more puzzling than an idea recently put to a test by KDKA engineers.

The idea involved the employment of a captive balloon, from which an antenna was suspended as depicted in the accompanying artist's drawing. The balloon was anchored by a cable in the usual manner.

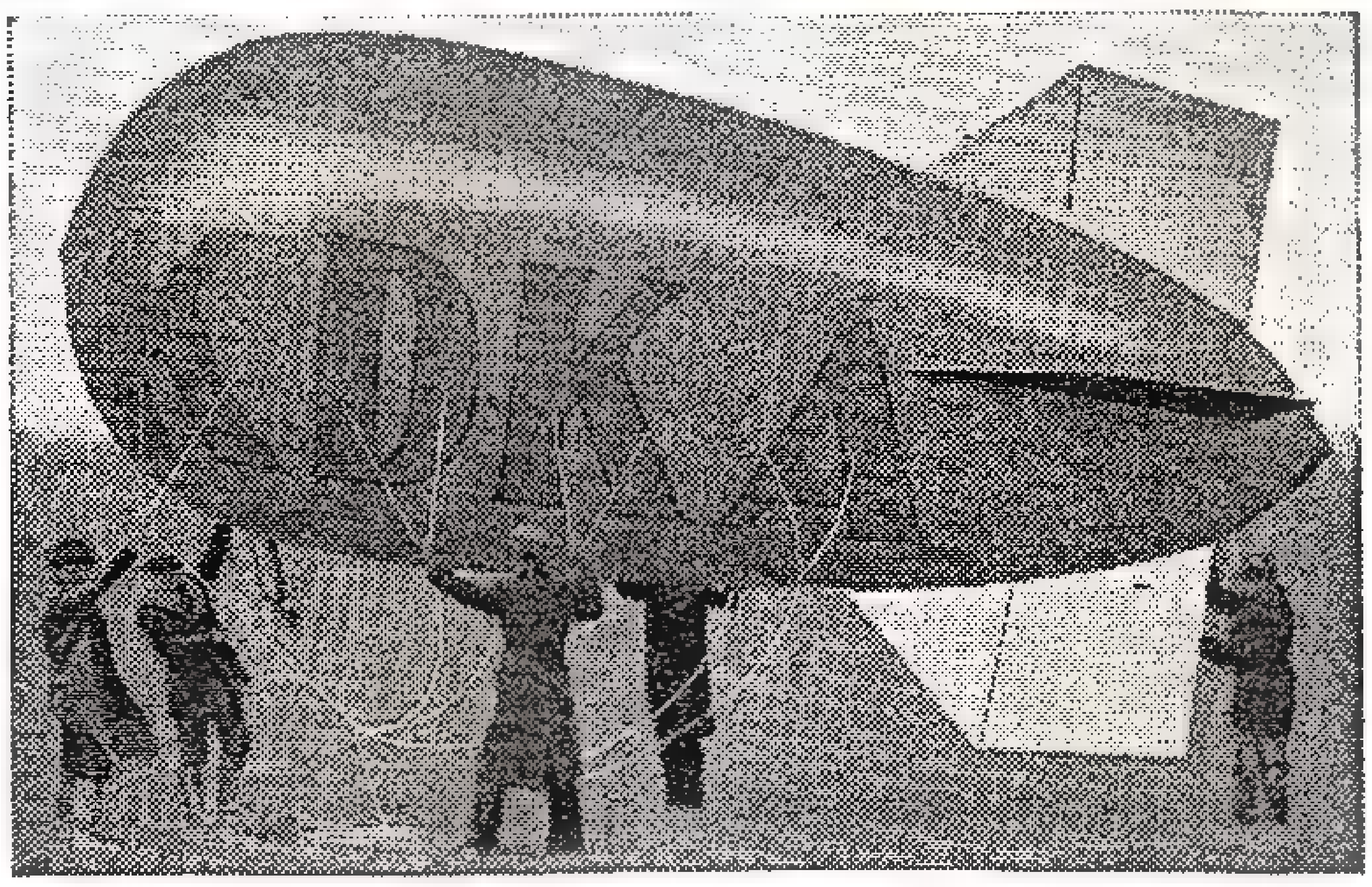
The object of the test was to determine the efficiency of a vertical antenna, and for this no more ideal "sky-hook" could be had than a captive balloon. Directional effects of this type of antenna were given a thorough test, but no data has yet been made available to indicate results.

Home Coolers for Summer Comfort



Portable cooler de-humidifies hot summer air.

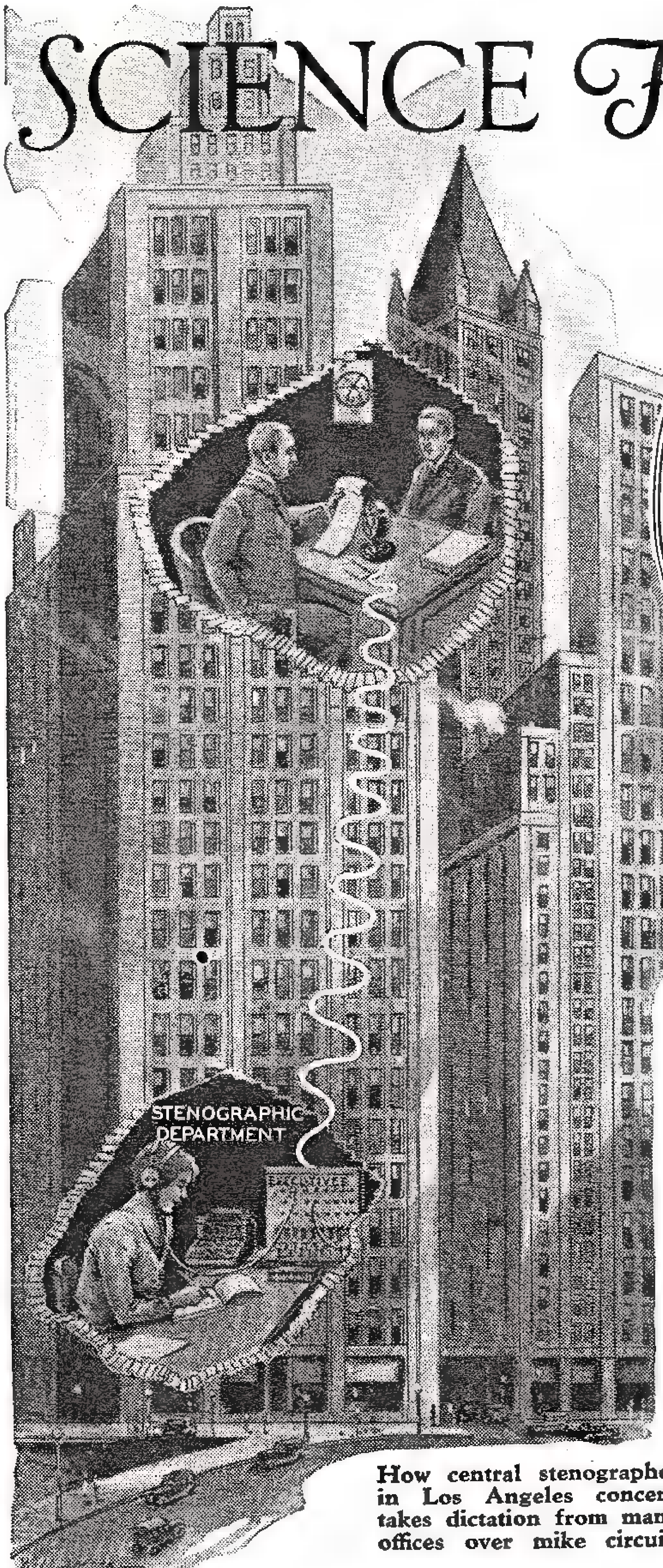
HEALTHFUL, comfortable air for all kinds of interiors is furnished by air-conditioning equipment now being marketed by a large manufacturer. At left is seen portable cooler which has proven popular. Its function is to cool the air and reduce the humidity on hot, sticky days.



Captive balloon employed in KDKA directional antenna test ready to be released for ascent.

Spoiled beer may be restored by pouring into the cask or bottle a small quantity of powdered chalk. Allow to remain until completely precipitated. A bit of coarsely powdered charcoal will also do the job satisfactorily. Syrup or molasses will restore taste to distasteful beer.

SCIENCE Finds Amazing



How central stenographer in Los Angeles concern takes dictation from many offices over mike circuit.

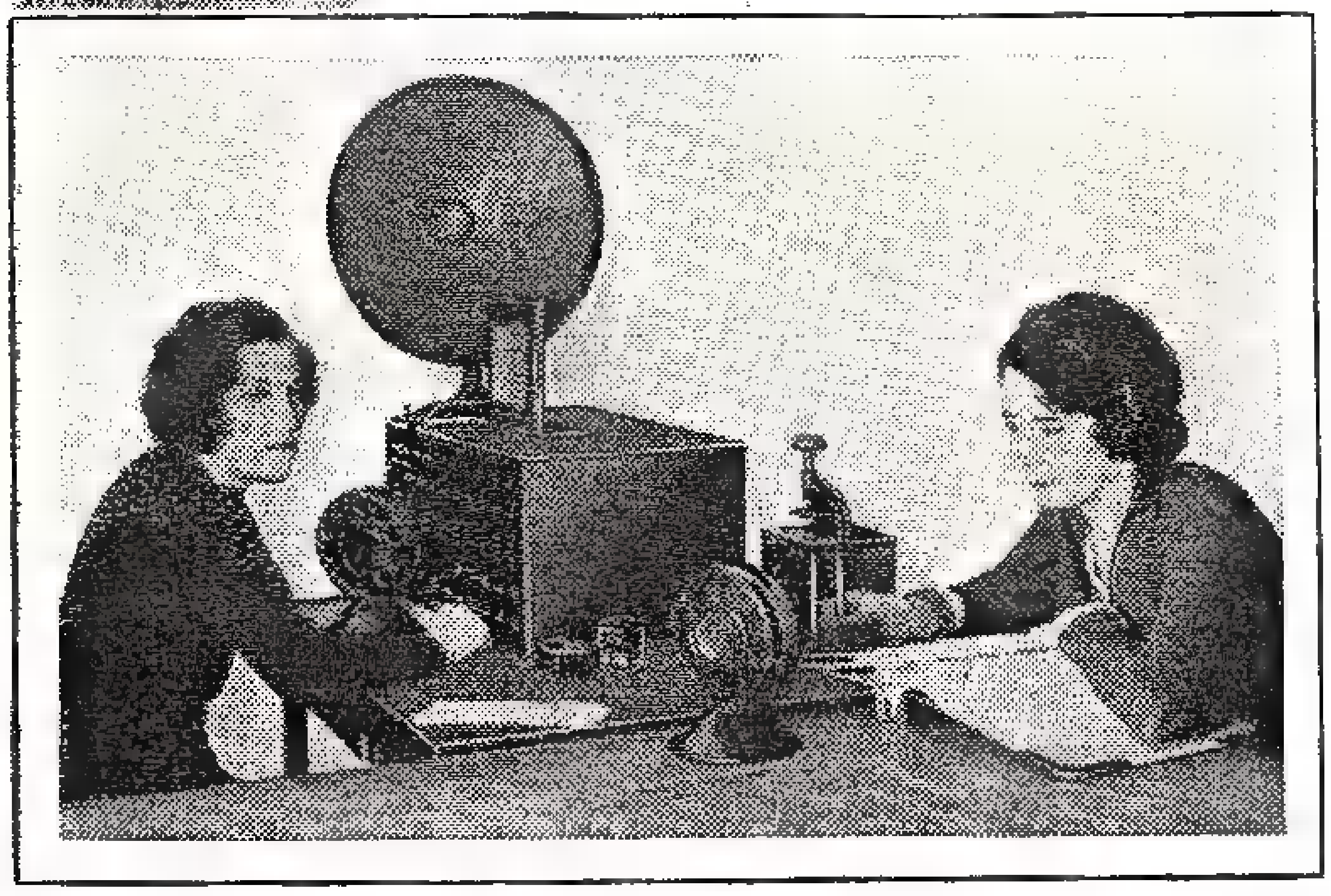
Broadcast technique of singers is greatly improved by small auxiliary microphones placed over nose sinus and chest. It is unnecessary to "hug" the mike during performance.

Once merely a device for transmitting conversations, the microphone has grown today to an instrument of the most diverse uses. Read here how this amazingly simple, yet amazingly sensitive, electric "ear" can guard our coasts from surprise naval attacks, how it warns of perilous pressures at mighty dams—and how it serves with equal efficiency the surgeon and auto mechanic.

PERHAPS the most amazing evolutionary progress of modern days, as differentiated from purely inventive progress, has been in the field of the microphone. So much so is this the case, that it might almost be said we are living in the age of the microphone.

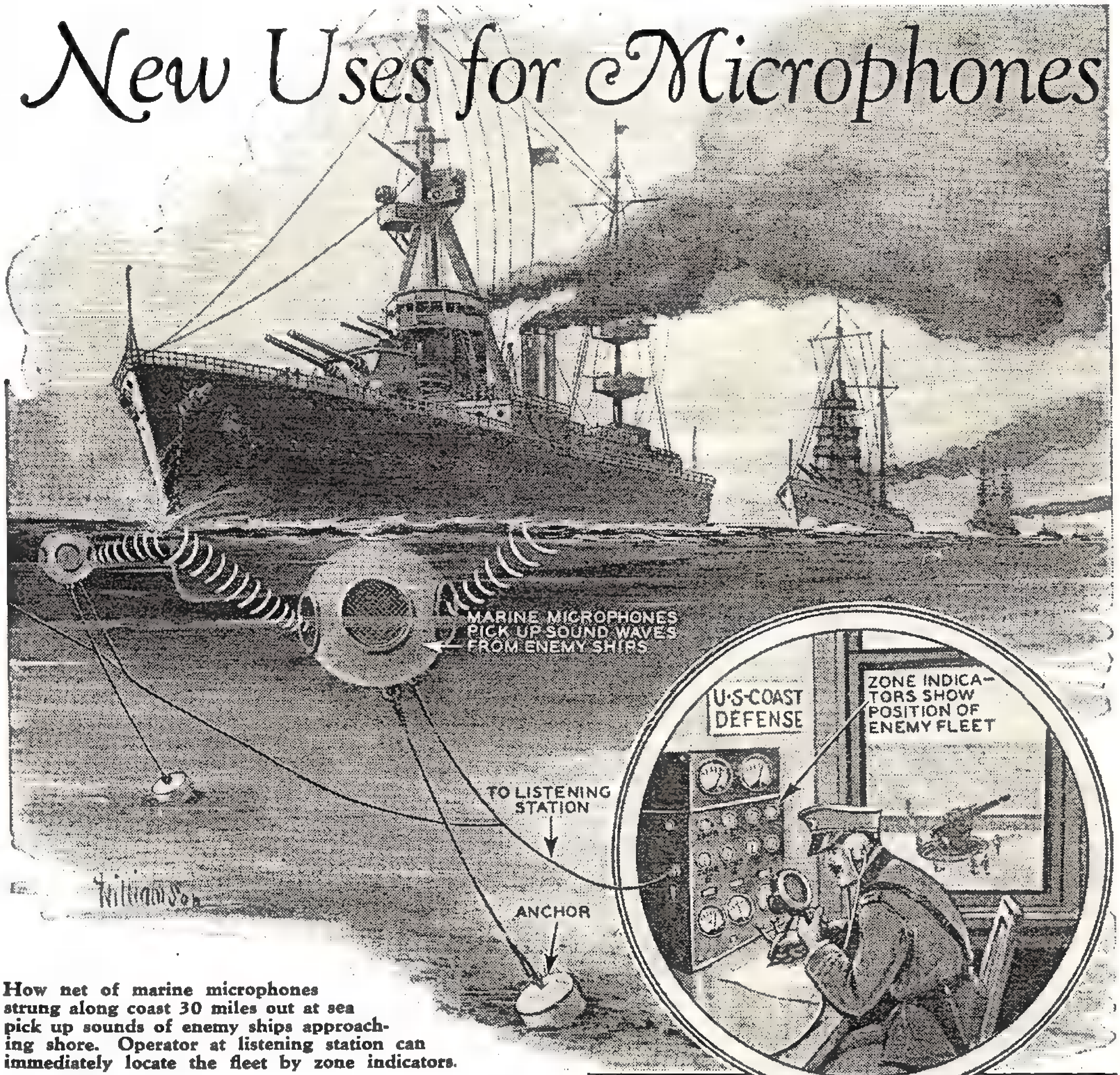
Far afield has the microphone gone from merely translating human voice into electrical impulses and back to voice again. In the vitals of mighty dams in the Rocky Mountains, imbedded microphones keep the observers in watch-towers constantly in touch with conditions down deep in the masonry. Earth slides under, or at the sides of, dams are heard in the microphones long before they become dangerous.

Excessive pressures of water against the masonry cause significant sounds in the microphone circuits. When the dam caretakers hear these sounds they press buttons which open spill-ways to evacuate water until safe pressure limits are reached.



At the stenographic end of the microphone circuit over which letters, contracts, etc., are received from offices. When office door opens a light flashes on the switchboard. If occupant is out the operator takes the message.

New Uses for Microphones

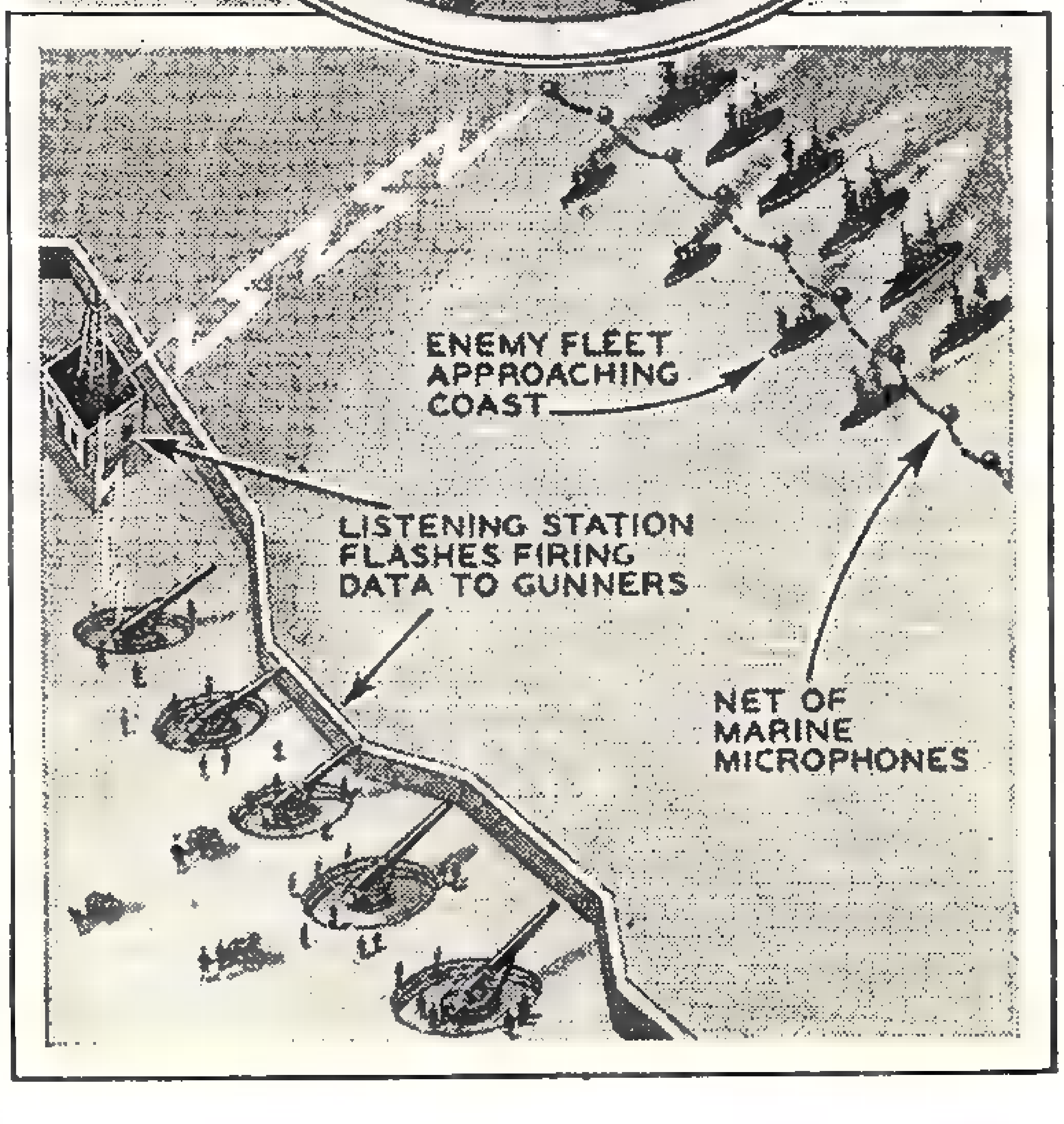

MARINE MICROPHONES PICK UP SOUND WAVES FROM ENEMY SHIPS
U·S·COAST DEFENSE
ZONE INDICATORS SHOW POSITION OF ENEMY FLEET
TO LISTENING STATION
ANCHOR
Williamson

How net of marine microphones strung along coast 30 miles out at sea pick up sounds of enemy ships approaching shore. Operator at listening station can immediately locate the fleet by zone indicators.

In the surgical wards of a great hospital, surgeons and nurses bend tensely over an abdominal operation. Instead of the measured voice of the nurse calling off the condition of the heart, often distracting the attention of the chief surgeon, a pulse of low, soft sound spreads through the whole room. It is the sound of the heart itself, beating over a microphonic circuit.

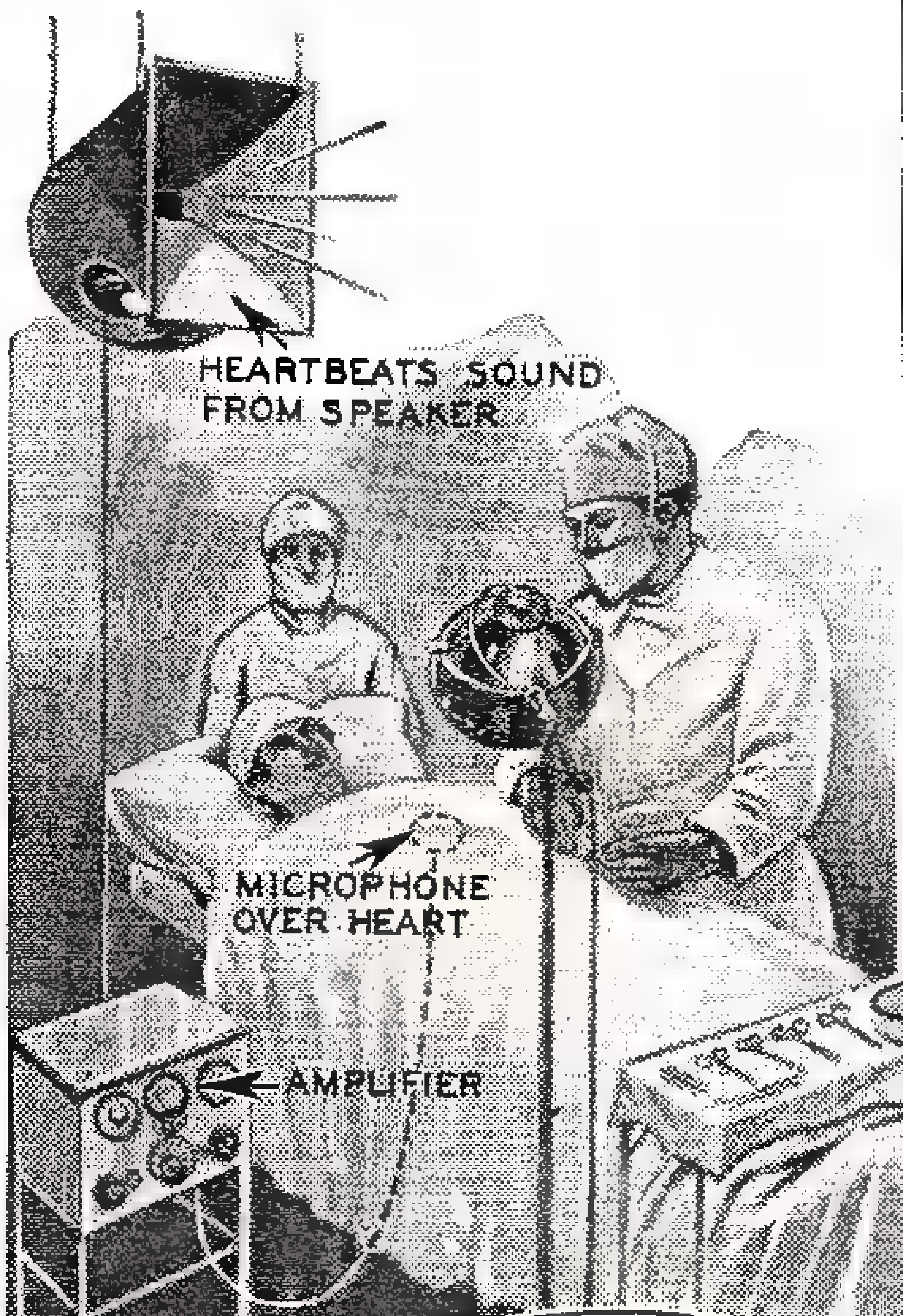
If it slows dangerously, or otherwise weakens, the surgeon takes appropriate steps to restore it to normal. Thus he is not suddenly obliged to stop his careful work at a dangerous point. Instinctively, he listens to the beat as he proceeds with his work, guiding his work according to the heart's condition. The sound of the heart could be amplified until it churned with the roar of Niagara. This, however, is never done, unless by internes or scientists experimenting with healthy persons.

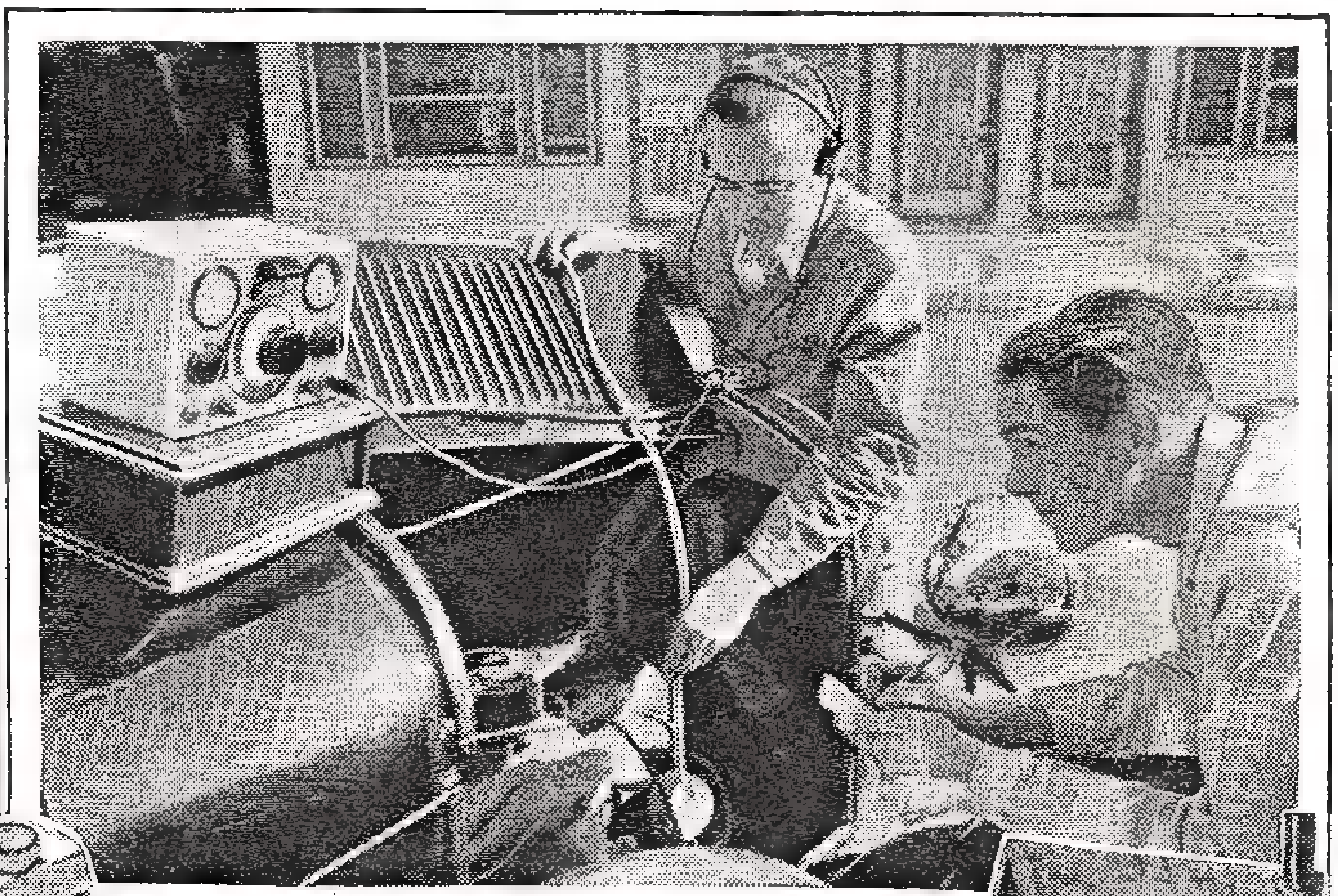
Indeed, the day is not far distant when the doctor will entirely dispense with his stethoscope, so long the badge of the medical profession, and simply place a microphone over the patient's heart and listen


ENEMY FLEET APPROACHING COAST
LISTENING STATION FLASHES FIRING DATA TO GUNNERS
NET OF MARINE MICROPHONES

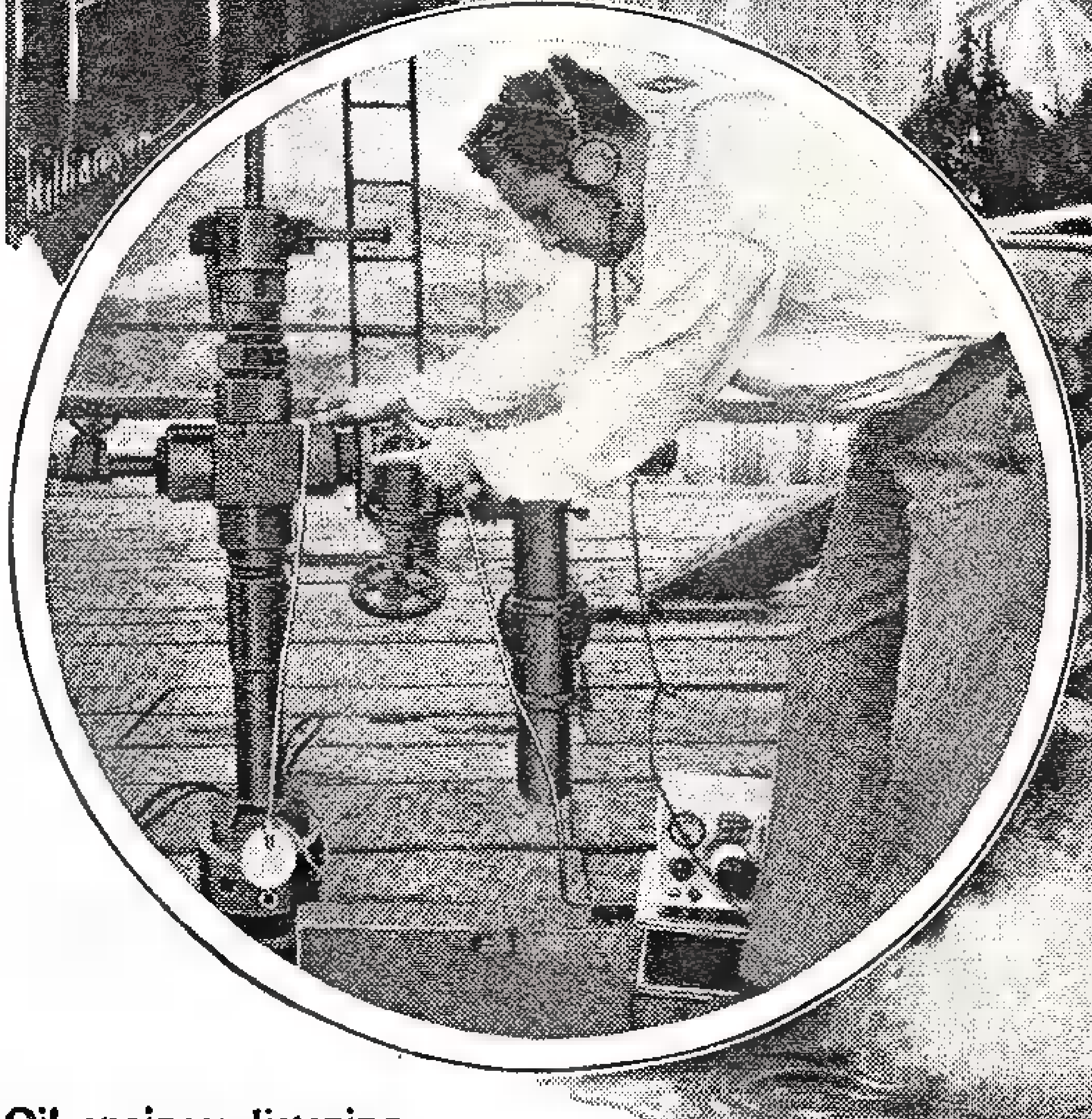
Picturized diagram here illustrates how enemy fleet approaching coast is located in war time. Sounds of churning propellers are picked up by the operator at listening station who immediately transmits firing data to coastal fort. Ships can thus be spotted before they come in firing range.

Mechanics Shoot Trouble in Motor by Listening to Sounds Over Mikes

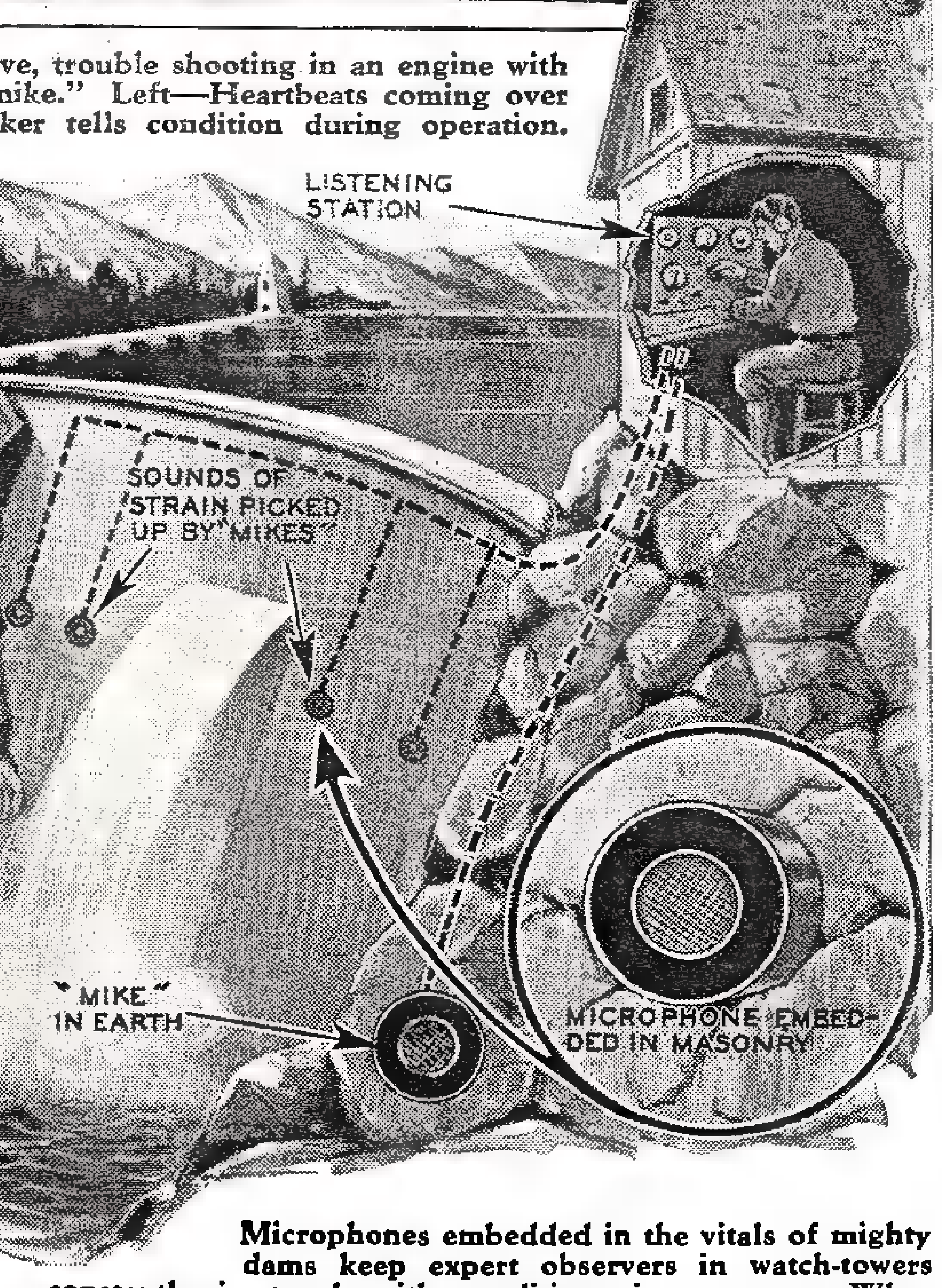




Above, trouble shooting in an engine with a "mike." Left—Heartbeats coming over speaker tells condition during operation.



Oil engineer listening in with supersensitive microphone to determine if water is entering the oil pipe at any point within its hundred feet of length.


LISTENING STATION
SOUNDS OF STRAIN PICKED UP BY "MIKES"
"MIKE" IN EARTH
MICROPHONE EMBEDDED IN MASONRY

Microphones embedded in the vitals of mighty dams keep expert observers in watch-towers constantly in touch with conditions in masonry. When certain sounds indicate excessive pressure is being exerted against dam, caretaker opens spillway to evacuate water till safe limits are reached. Mikes also warn of landslides.

very comfortably for any significant sounds. For the examination of lungs, too, the microphone is proving an ideal instrument. All meaningful sounds can be picked up and accurately classified.

Plans have been prepared, in event of war, to place a first-line net of microphones all along the coasts, so that trained men ashore may read the sounds of all ships passing. With knowledge of where our own ships are cruising, we thus can tell whether or not enemy vessels are approaching our shores. Heavy ships, capable of carrying long-range guns, can always be thus announced long before their guns come within range of our shore, and appropriate measures taken to resist them.

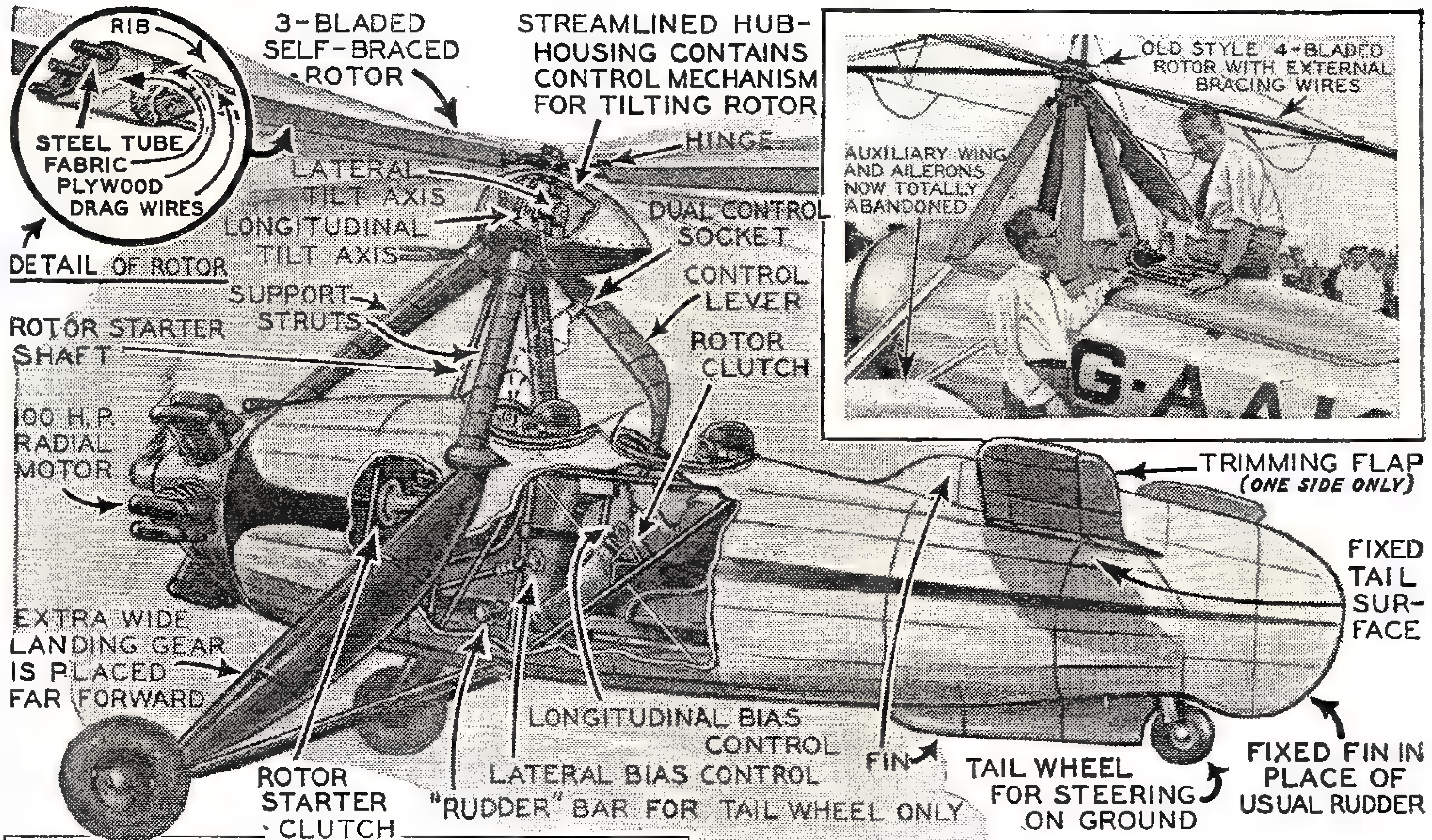
The microphone thus eliminates thousands of scout vessels which would otherwise be necessary. The value of this expedient to a nation with a long coast line, such as our own, is manifest.

The new condenser and carbon type microphones, highly refined for use in the talkies and in modern radio transmission, have made possible truly amazing applications to many phases of modern life.

Ships at sea are now being equipped with a thermostat and a microphone in every compartment that lies along the keel and hull. If fire breaks out, the thermostat re-

(Continued on page 137)

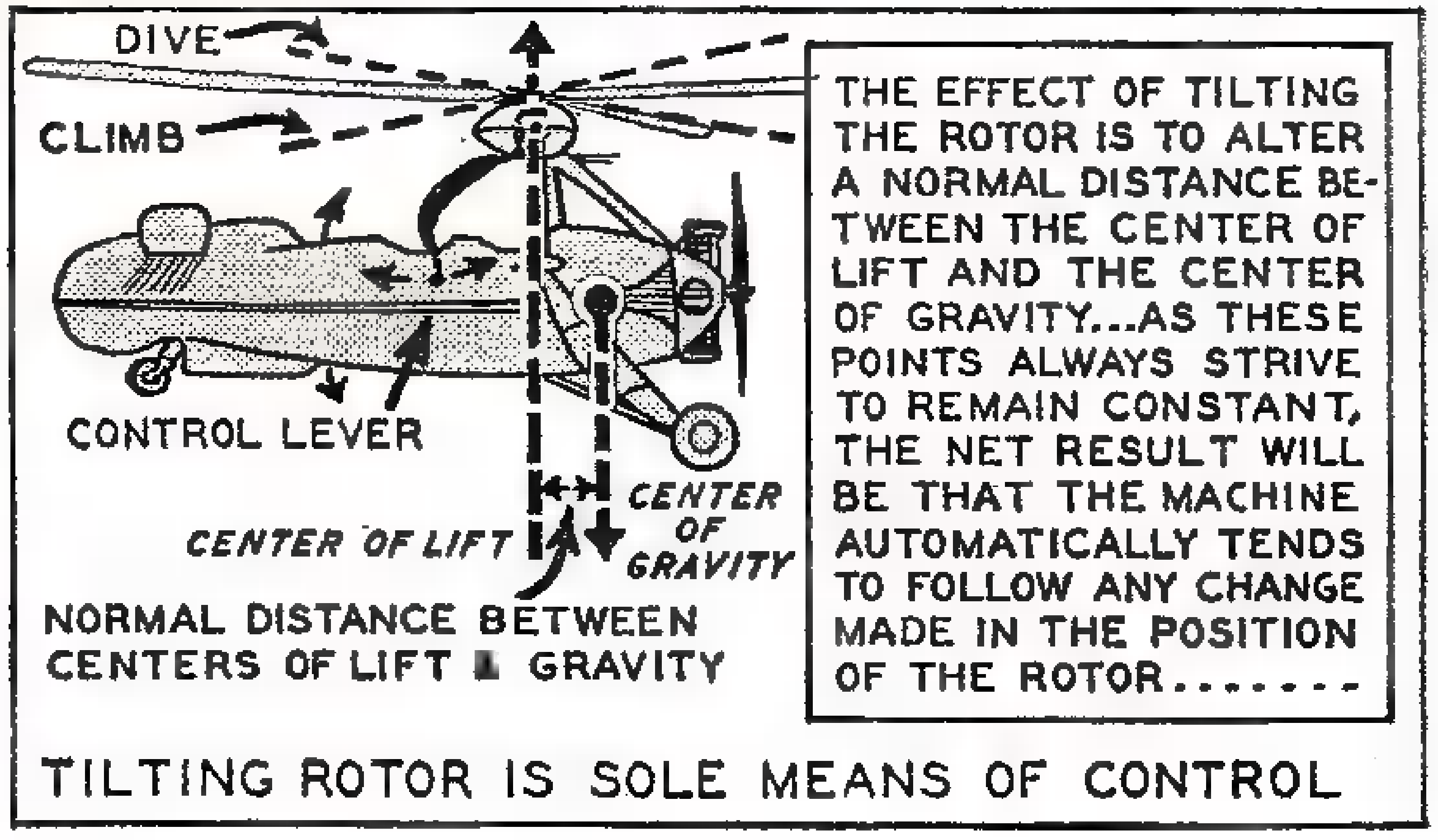
Gyro With Single Control Eliminates Wings


RIB
STEEL TUBE
FABRIC
PLYWOOD
DRAG WIRES
DETAIL OF ROTOR
3-BLADED SELF-BRACED ROTOR
STREAMLINED HUB-HOUSING CONTAINS CONTROL MECHANISM FOR TILTING ROTOR
HINGE
LATERAL TILT AXIS
LONGITUDINAL TILT AXIS
DUAL CONTROL SOCKET
CONTROL LEVER
SUPPORT STRUTS
ROTOR STARTER SHAFT
ROTOR CLUTCH
100 H.P. RADIAL MOTOR
OLD STYLE 4-BLADED ROTOR WITH EXTERNAL BRACING WIRES
AUXILIARY WING AND AILERONS NOW TOTALLY ABANDONED
G-AA
TRIMMING FLAP (ONE SIDE ONLY)
FIXED TAIL SURFACE
EXTRA WIDE LANDING GEAR IS PLACED FAR FORWARD
LONGITUDINAL BIAS CONTROL
LATERAL BIAS CONTROL
FIN
TAIL WHEEL FOR STEERING ON GROUND
FIXED FIN IN PLACE OF USUAL RUDDER
ROTOR STARTER CLUTCH
"RUDDER" BAR FOR TAIL WHEEL ONLY

Pilot has perfect control of new Cierva 'gyro at all times, even when it is flying at speed slower than that of running man. Here a package is being picked up from dropped line.

A REMARKABLE advance toward simplicity in the construction and operation of the autogyro is represented in the development of a wingless plane by Senor de la Cierva, famous Spanish gyro designer.

What in particular has attracted the attention of aeronautical engineers to the new craft is the elimination of the usual controls, namely, ailerons, elevators and rudders. Instead of these elements, the ship has a single joy stick with which the pilot can tilt the rotor in any desired direction, giving perfect lateral and directional control.


DIVE
CLIMB
CONTROL LEVER
CENTER OF LIFT
CENTER OF GRAVITY
NORMAL DISTANCE BETWEEN CENTERS OF LIFT & GRAVITY
THE EFFECT OF TILTING THE ROTOR IS TO ALTER A NORMAL DISTANCE BETWEEN THE CENTER OF LIFT AND THE CENTER OF GRAVITY...AS THESE POINTS ALWAYS STRIVE TO REMAIN CONSTANT, THE NET RESULT WILL BE THAT THE MACHINE AUTOMATICALLY TENDS TO FOLLOW ANY CHANGE MADE IN THE POSITION OF THE ROTOR.......
TILTING ROTOR IS SOLE MEANS OF CONTROL

Drawing illustrates how tilting the rotor puts plane into a climb or dive. Tilting rotor to right or left banks the plane to right or left respectively. Lever is only control on ship.

How the banking, climbing and diving maneuvers are performed by manipulation of the control lever is shown in an accompanying drawing. To bank, the pilot tilts the rotors downward on the side toward which he wishes to turn. The body then swings around until the lift line passes through the center of gravity.

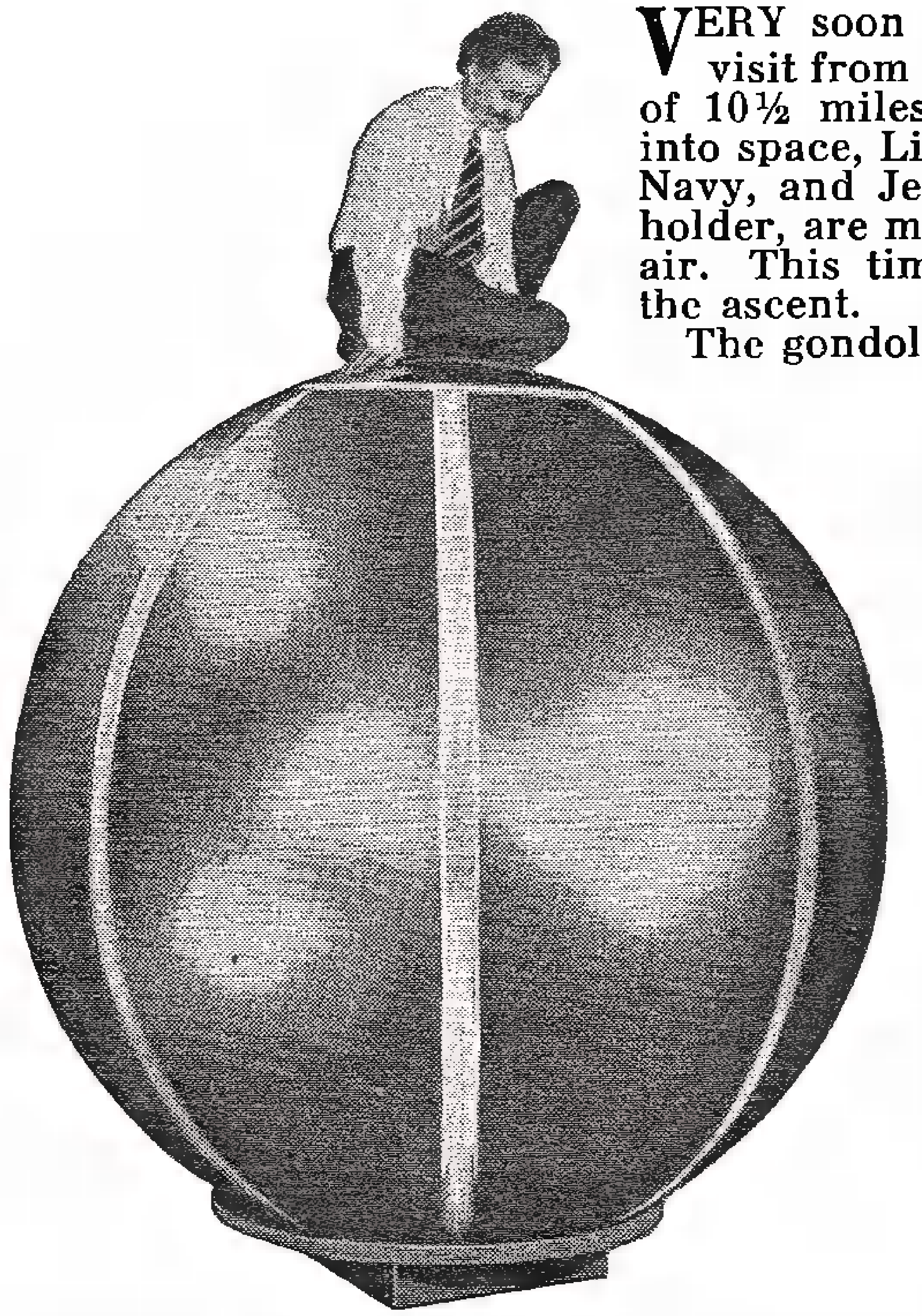
Another outstanding feature which won approval of the aviation world was the take-off of the machine. When fully loaded and taking off in a dead calm, the plane gets into the air after a 25-yard run, and when lightly loaded with a five-mile breeze, it can take off with a 15 ft. run.

Other noteworthy points of interest about the craft are: It is powered by a 100 h.p. Armstrong-Siddeley "Genet" motor, and attains a top speed of 100 m.p.h.

Here's Gondola That May Set New Stratosphere Record

VERY soon now the stratosphere will receive another visit from the earth. Hoping to beat the altitude record of 10½ miles established by Prof. Piccard in his flight into space, Lieut. Commander T. G. W. Settle, of the U. S. Navy, and Jean Piccard, brother of Auguste, the record holder, are making preparations for a journey into upper air. This time Chicago is expected to be the scene of the ascent.

The gondola which will house the stratosphere expedition is seen in the accompanying photo, topped by Jean Piccard. It weighs 200 lbs. and closely resembles metal balls previously used. An innovation this trip will be a wireless transmitting outfit which will keep the world below informed of the progress of the air explorers.



Jean Piccard, brother of the stratosphere record holder, inspecting gondola in which he will seek to establish new altitude record, ascending from Soldier's Field, Chicago.

Re-silvering a Telescope Mirror

TWICE a year half a dozen men must spend two days and nights spreading the equivalent of a silver quarter over the face of the largest telescope mirror in the world, that of the 100-inch telescope at the Mount Wilson Observatory in California.

The layer is less than one-hundred-thousandth of an inch thick, and is deposited on the glass by mixing a solution of silver with rock candy, forming metallic silver which adheres tightly to the glass.

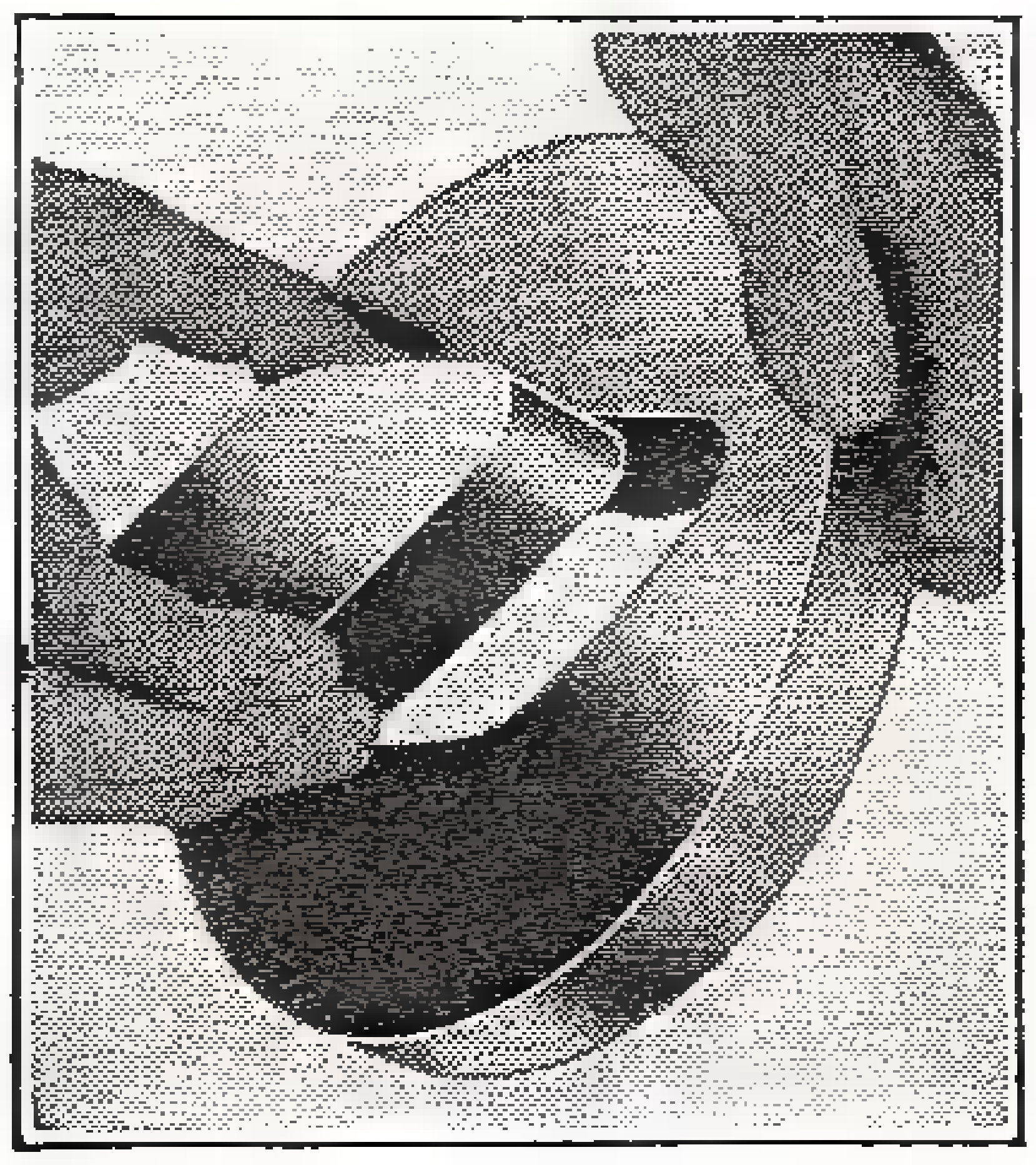
Restoring Typewriter Tampon

THE tampon of your typewriter—that rubber-covered cylinder which the keys hit and which frequently becomes pitted and hard—may be made almost as good as new with a piece of very fine sandpaper tacked over a wood block. Hold the sandpaper against the tampon and turn the knob until the rubber is worn smooth. This also softens tampon.

Turning tampon against sandpaper smoothes rubber surface.

Lathe Device Turns Many Shapes

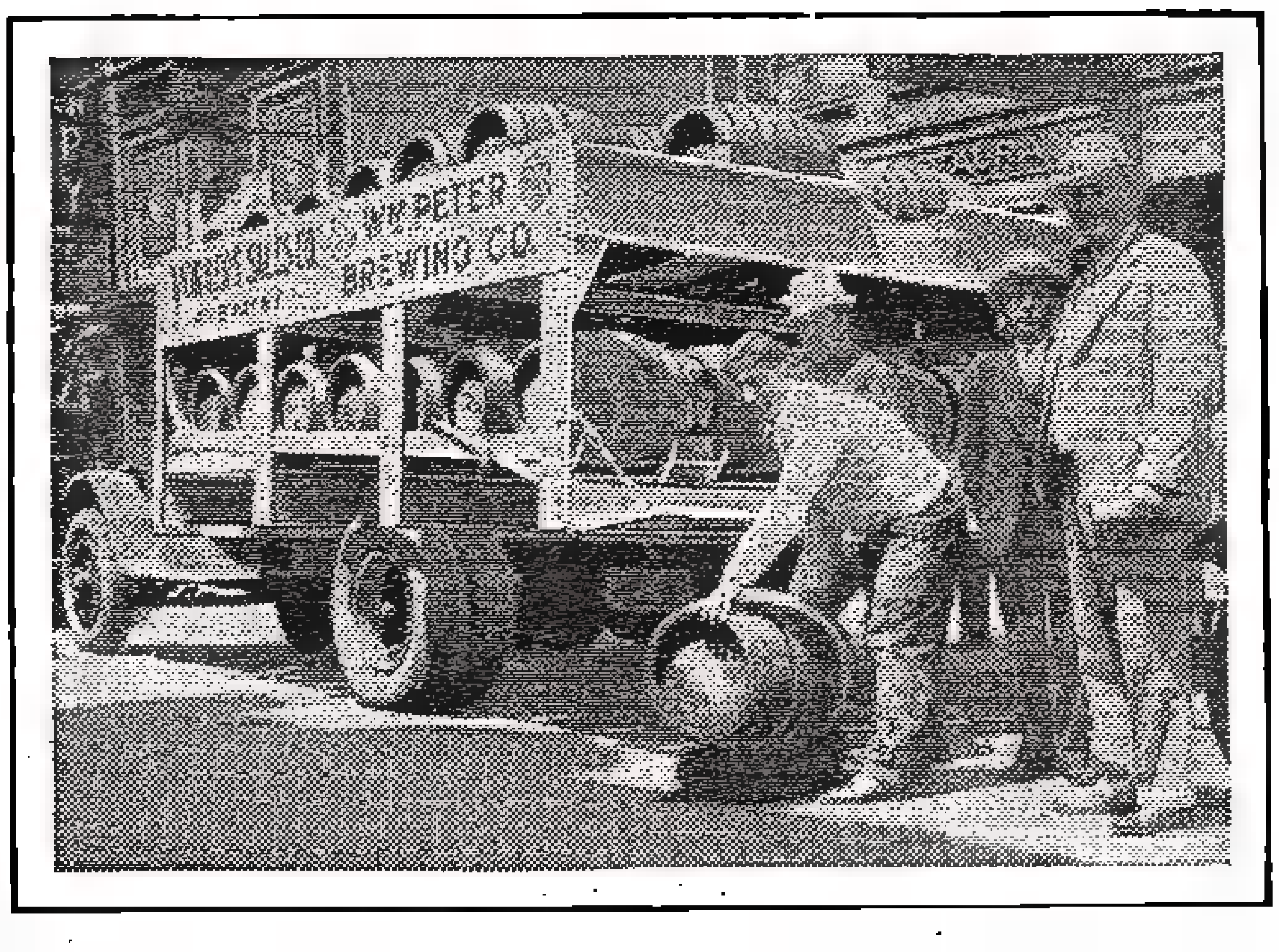
OVALS, squares, triangles, hexagons — any shape up to 16 sides, either flat, concave or convex—can now be produced with a device that rests on the tool-carrying bridge of the lathe. With it, also, it is possible to bore, turn and face shapes other than round. The turned shape fits so perfectly into the bored piece that light is practically excluded when they are fitted together.



Pieces turned from lathe device which produces any shape.

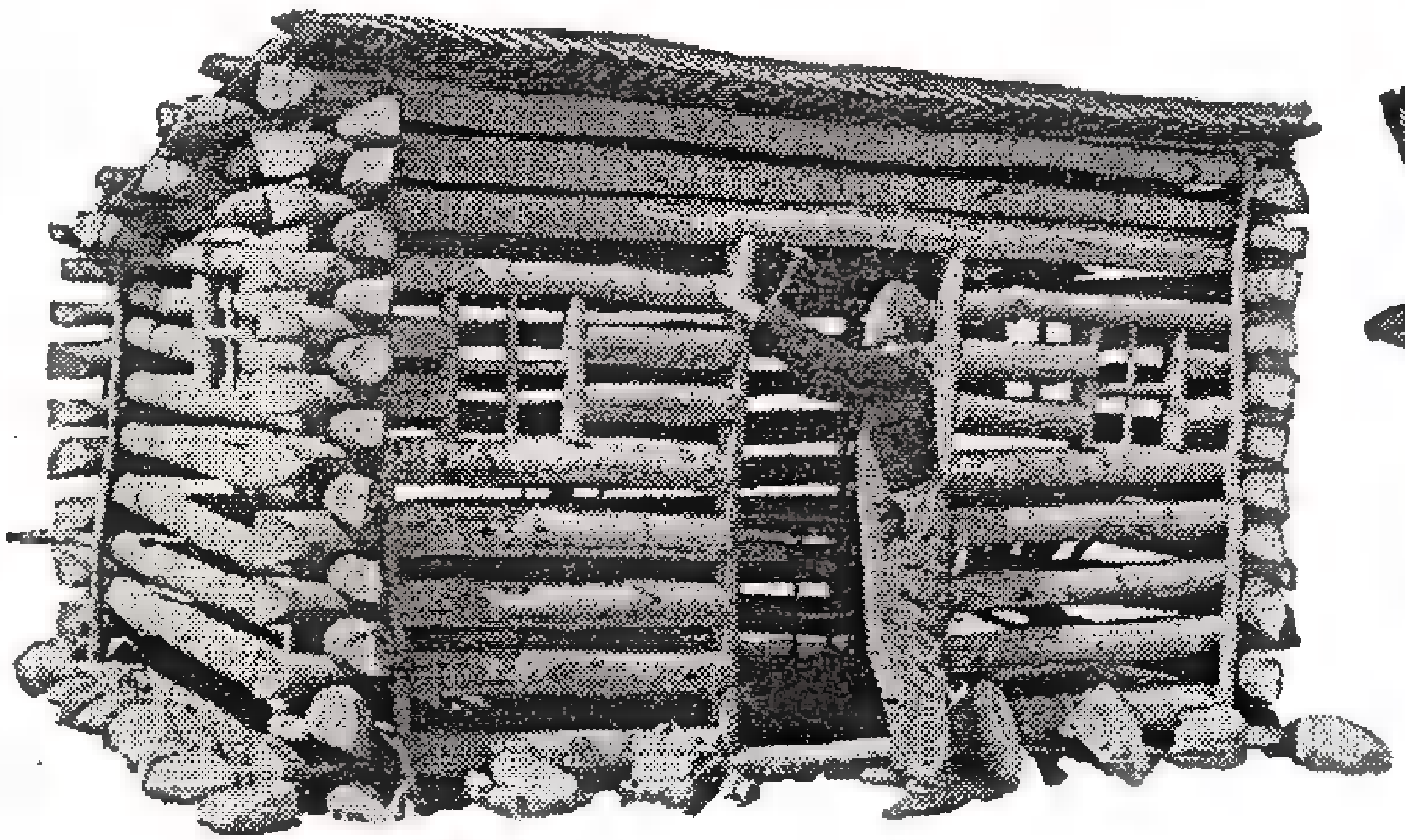
New Beer Truck Speeds Delivery

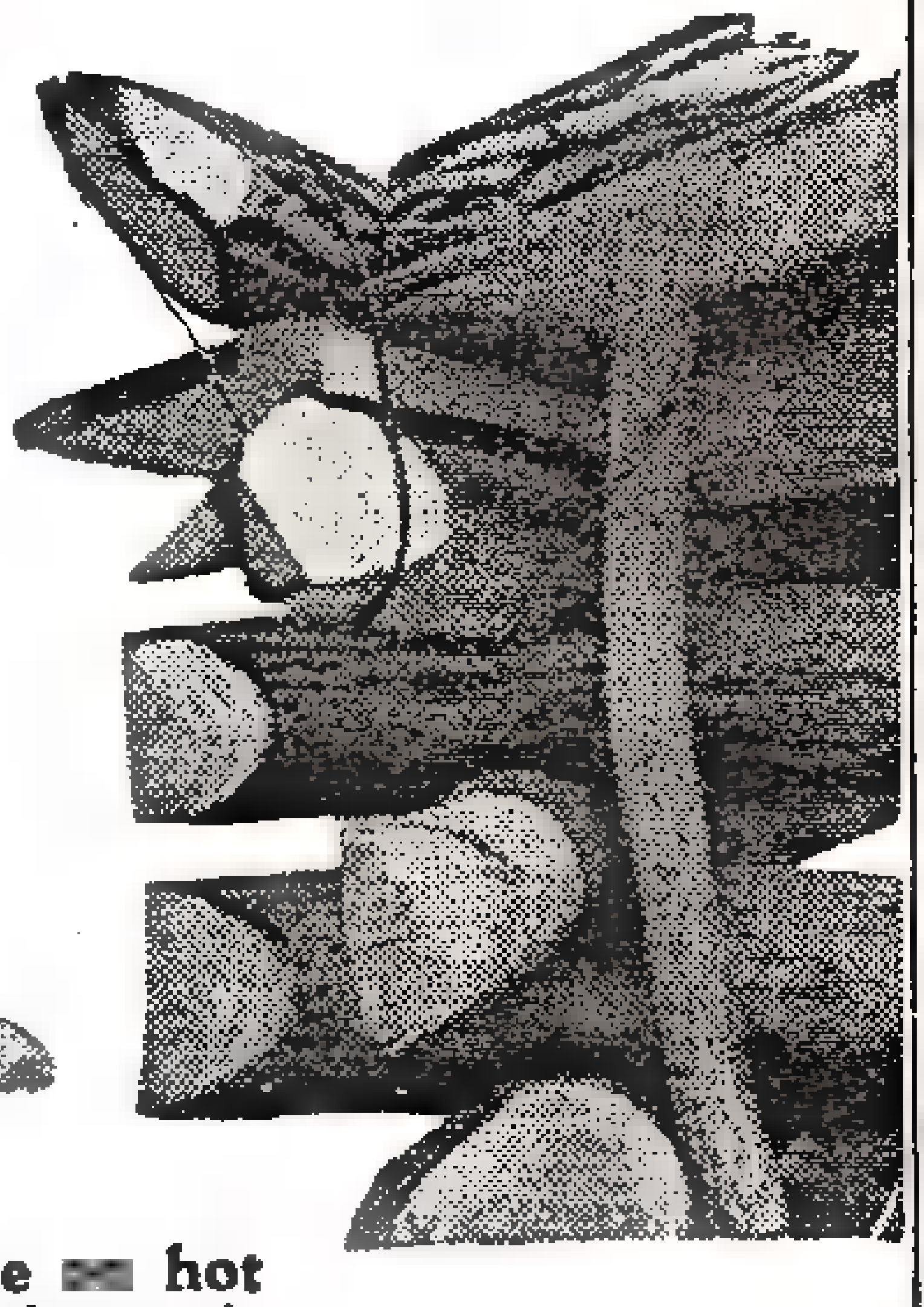
THE heavy demand for 3.2 per cent beer has been responsible for the development of a new type of beer truck which is expected to cut in half the time of loading and delivering the beer. Shown below, the truck carries 56 barrels. In the unloading process, when one barrel is removed from the rear platform another automatically falls into place. Operation of a lever unloads the entire truckload of empty barrels in one minute.



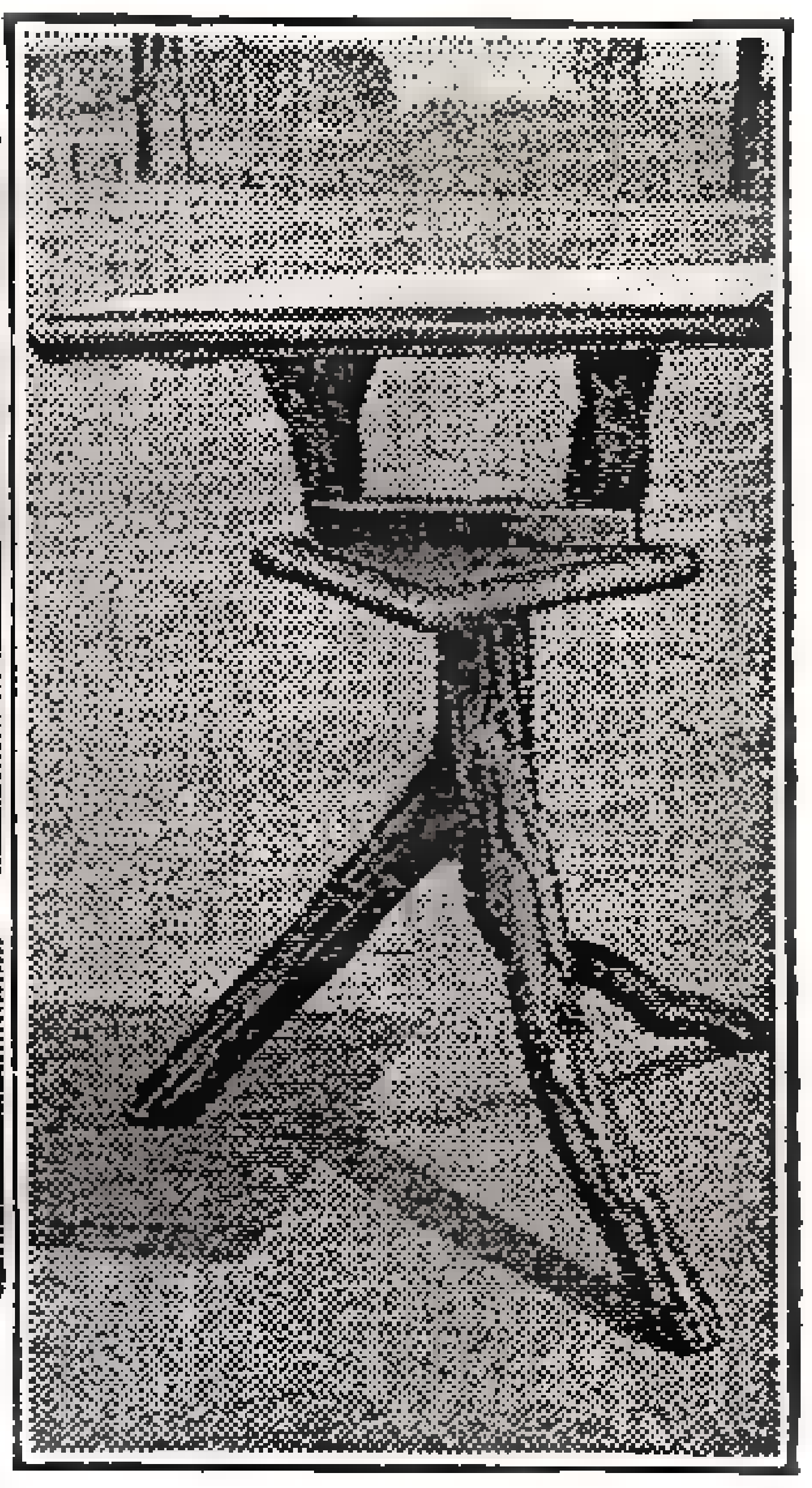
Barrels roll down an platform to be unloaded from truck.

Unusual Ideas in Rustic WOODCRAFT

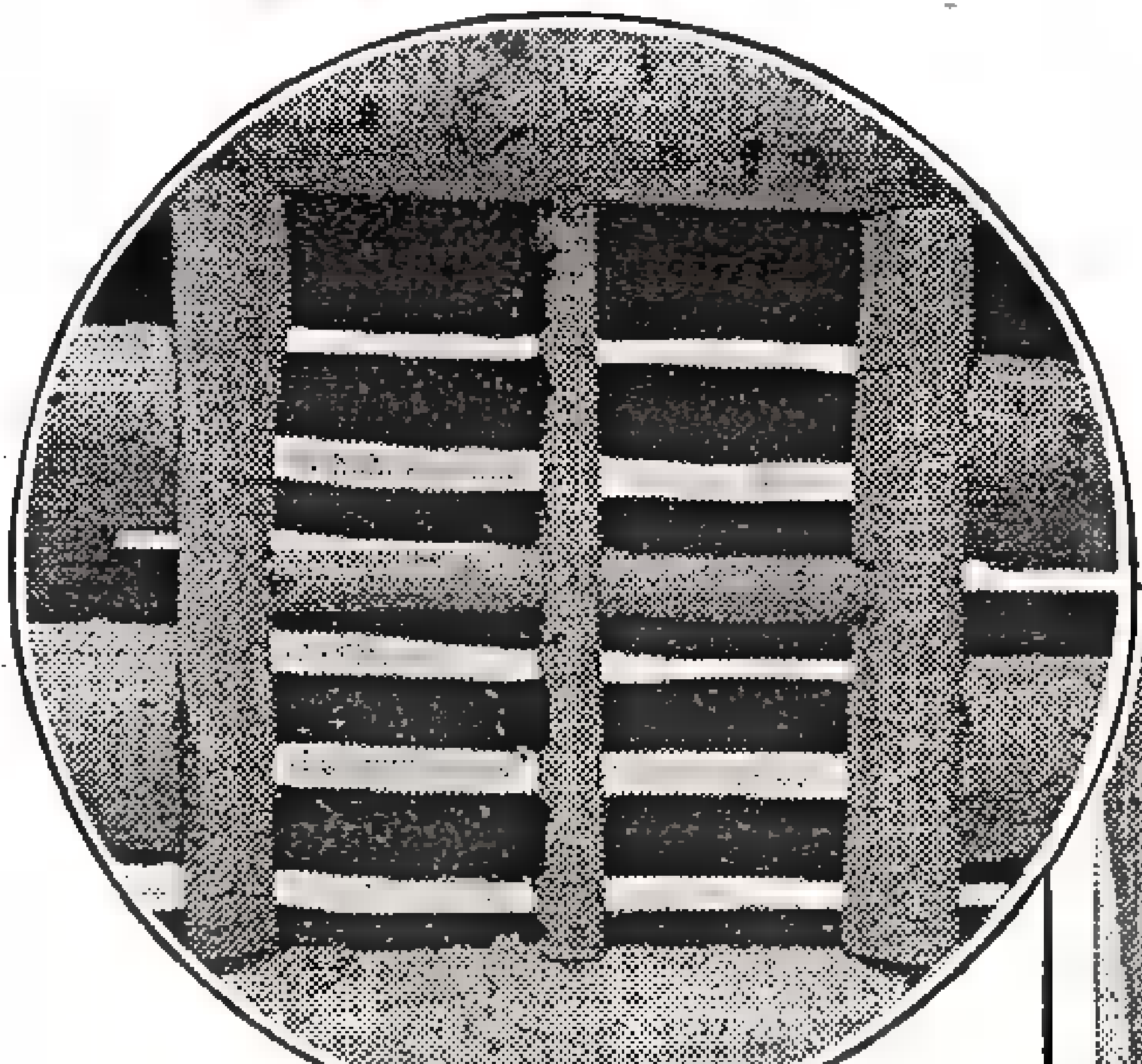




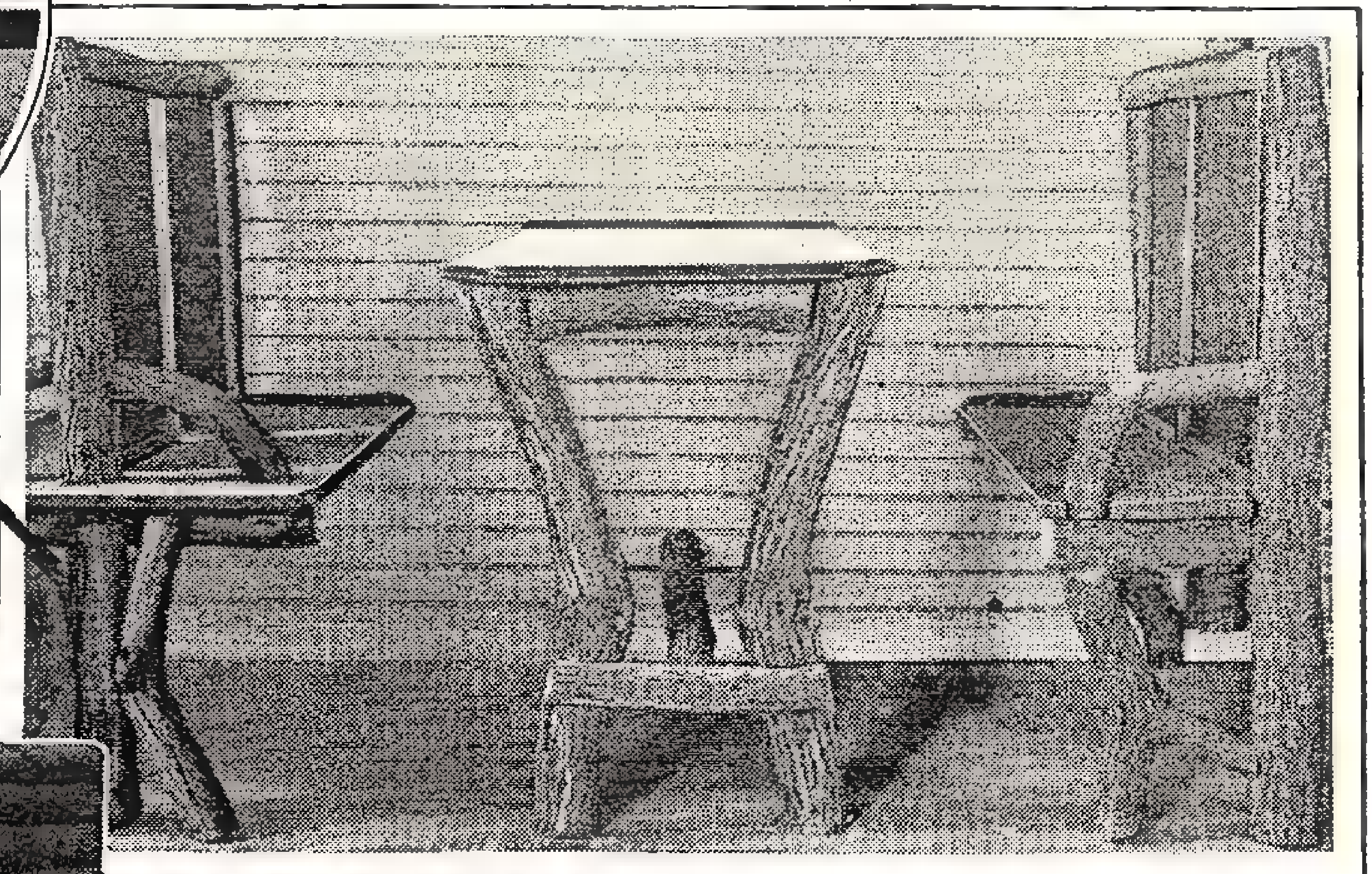
Ideal for cool refuge on hot summer days is this fresh air cabin. Dimensions are 10'x15'x9' high, with 2' drop of roof to rear. Roof is of old time construction, consisting of 4' lengths of sapling split wedge-shaped and laid shingle fashion in rows, the joining between rows being covered by small straight saplings bound to corners by fence wire as shown. Vines add to coolness.



Tree crotch forms legs for double-deck table. Sides of the two tops are trimmed with split branches of small diameter.

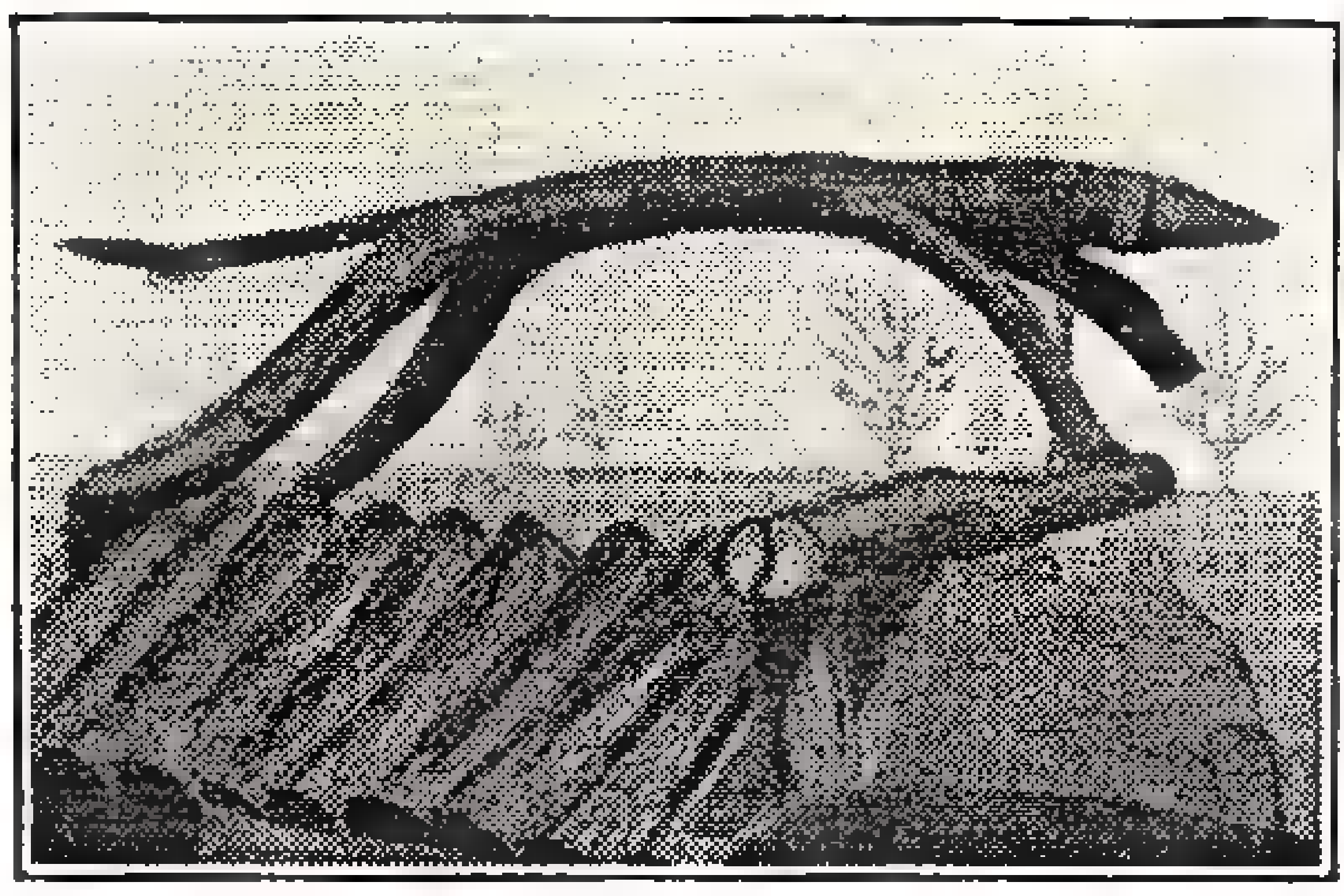


Decorative windows for the fresh air cabin are shown here. Use any design your ingenuity suggests.

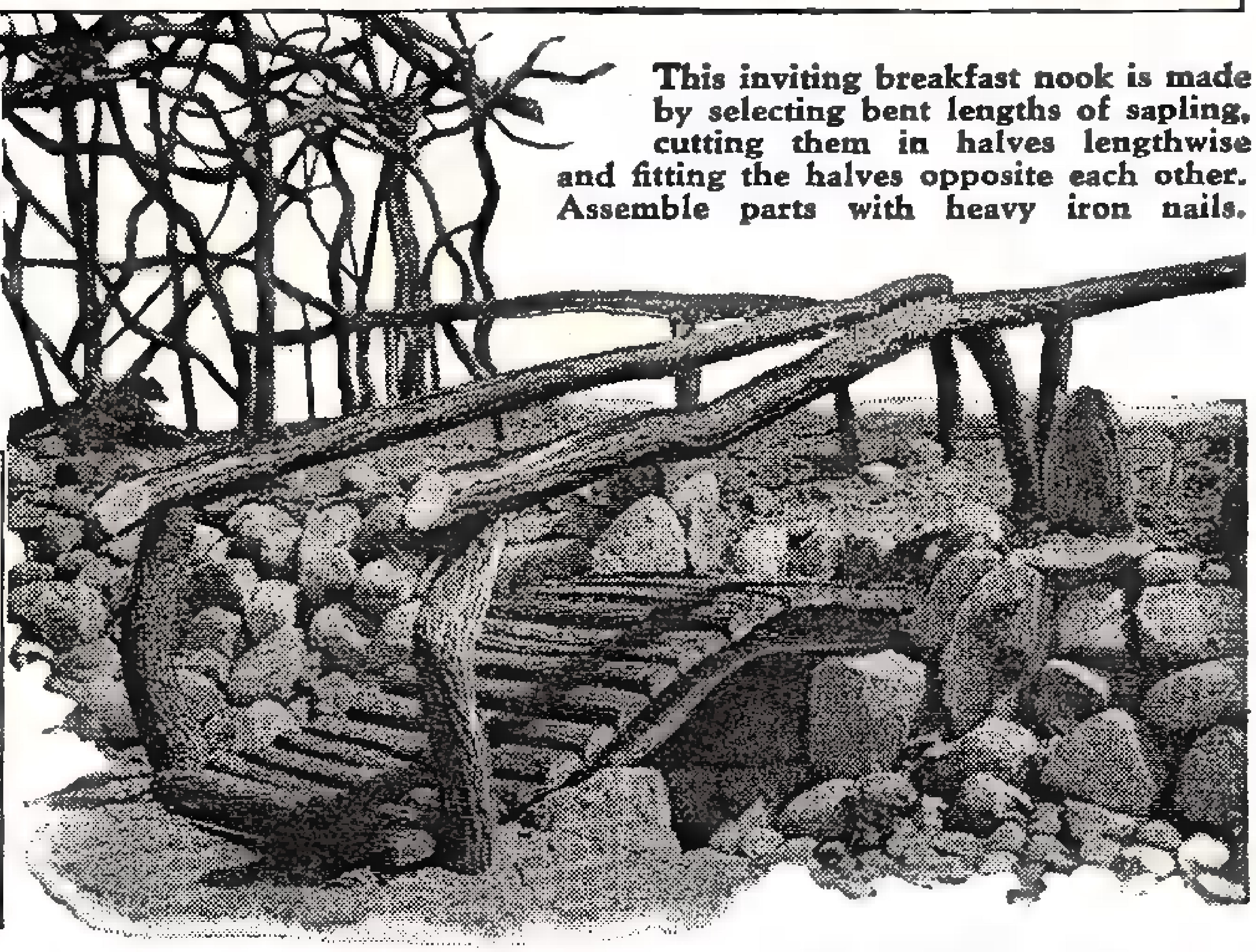


This inviting breakfast nook is made by selecting bent lengths of sapling, cutting them in halves lengthwise and fitting the halves opposite each other. Assemble parts with heavy iron nails.

Purely ornamental is old man of the well. Head is hand carved from block of wood, body is wood frame covered with clothes.



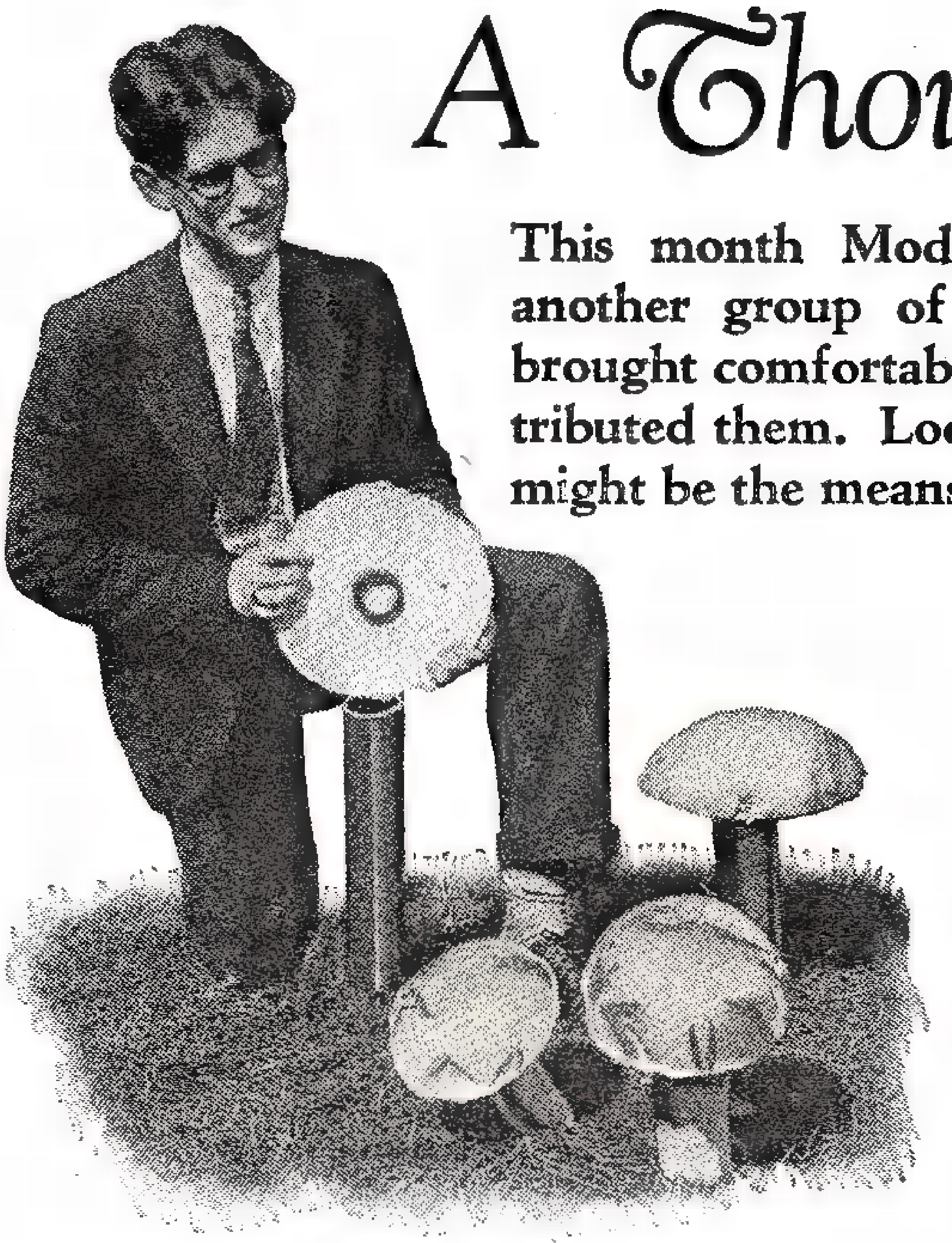
Dog is made from odd shaped branch, trimmed down to canine shape, and mounted as shown, to make unique ornament.



Rustic but sturdy bridge over artificial stream has flooring of split saplings supported by crooked young tree trunks, while fence is supported at corners with tree crotch. Arbors in background are crooked saplings wired together.

A Thousand WAYS

This month Modern Mechanix and Inventions proffers another group of tested money making ideas that have brought comfortable depression incomes to readers who contributed them. Look the items over carefully—one of them might be the means of solving your unemployment problem.



Profits in Synthetic Toadstools

Something strikingly unique in yard ornaments are the concrete toad stools which a Portland, Oregon, man makes for 15 cents and sells for 75 cents to neighbors, who are glad to purchase such a novel decoration. Making the toadstools is surprisingly easy. Into a mould made from an old chopping bowl—over the inside of which has been spread a layer of old newspapers—pour some cement, imbedding in the bottom a short length of pipe to serve as the stem. The paper forms creases in the top, while painting different shades of green and brown enhances attractiveness of the stools. They should be "planted" in the ground in groups—which will mean more orders for you.

Servicing Automobiles

Enterprising but jobless auto mechanics will find a lucrative source of income in a maintenance scheme being worked by a New York ex-garage man. The plan requires no shop—you call at the auto owner's garage and service his car four times a month. On the first call, you check the ignition; on the second, check brakes and steering; on following calls you grease and tighten up. In short, you keep the car in perfect condition.

Giving each car an hour's work you can service eight cars a day, totaling 48 cars each week and paying you at least $200 a month. A few hundred circulars explaining your services will help to bring you the 48 customers. It will pay you to employ a helper to clean interior, windows, dust body, etc., gratis.

Sharpening Razor Blades

An inexpensive razor blade sharpener was the nucleus of a lucrative repeat business worked up by an ex-soldier in Creston, Iowa. At first he set a price of a cent a blade, and sharpened them right at the house. Later he purchased wholesale a large number of wine glasses which he left with the customers so they might have a receptacle in which to deposit the dull blades until he returned, thereby increasing business a great deal. Eventually he started a mail order sharpening service in addition, which kept him busy far into the night. Now he has a comfortable living from a long list of satisfied customers.

Income for Radio Fans

A radio fan living in Atlanta, Ga., capitalized upon his hobby and now earns a comfortable income selling old radio parts to fellow fans who "build their own" sets. Visiting all the radio shops in town, he found that each had one to two dozen obsolete "trade-in" battery sets which they were glad to get rid of for as little as 50 to 75 cents each. Next, in his radio work shop, he dismantled each set, salvaged all the useful parts, then had a radio repair man test them to determine their values. An ad inserted in a local paper to the effect that used radio parts were for sale at a fraction of their regular prices brought $5 profit the first day. Advertising in papers in surrounding small towns brought his income up to $50 a week.

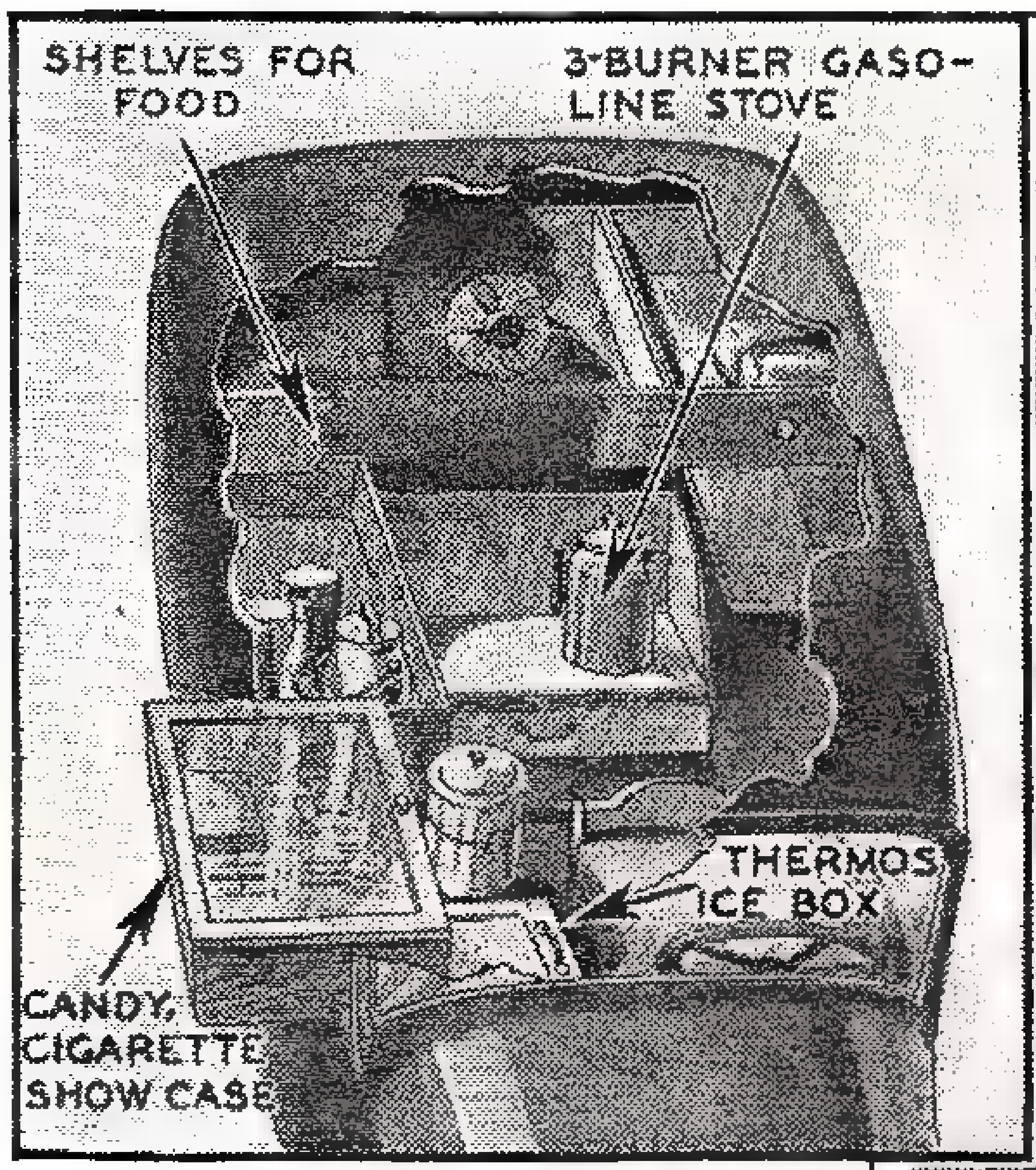
Money in Bleaching Water

Forty dollars per week is the average income of a New York city man who manufactures a bleaching water for clothes. His product is manufactured at home from a formula he found in Henley's 20th Century book of Formulas and Recipes, and sells for 30 cents a gallon. Housewives found his product so satisfactory that he has been able to build up a regular route. He earns now more than he did during boom time, and is thankful he got laid off.

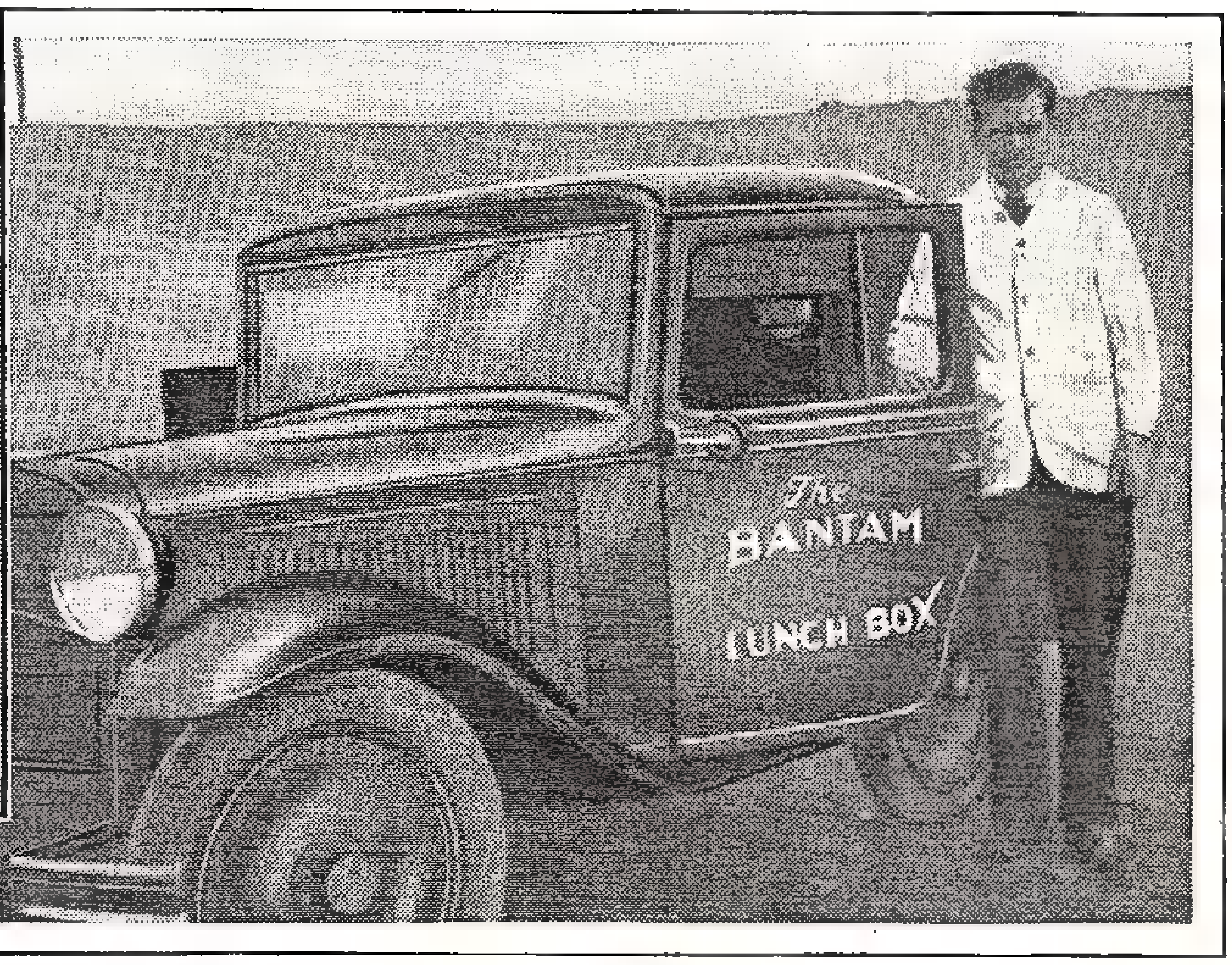
Bantam Lunch Boxes

Selling "bantam lunch boxes" to workers in factories, on construction jobs, and in offices remote from a convenient lunch room brings Edwin Delvin, of Springfield, Mass., a profit of $35 to $50 weekly. He gets around to his customers in his Austin business coupe which he has converted into a veritable rolling restaurant. His equipment, occupying all space but the

TO MAKE a LIVING



Artist's drawing above shows construction of the various compartments of the Bantam lunch box.



driver's seat, consists of a small 3-burner gasoline stove built across the rear inside, a small thermos ice box at the front, and sufficient shelves at sides and top to carry such edibles as bread, cheese, hot dogs, etc., as well as cooking and eating utensils. A small show case across the window sill displays cigarettes, candy, etc., at standard prices.

Polishing Auto Headlights

Cleaning and polishing headlights of autos belonging to business men, store managers, shop and factory workers contacted during the dinner hour is the ingenious scheme employed by an Oakland, California, man to rake in depression shekels. Few inexpensive materials needed are denatured alcohol, a dime's worth of lamp black and some cotton. Mixture of alcohol and lamp black is rubbed on the glass lenses and reflectors and when dry is rubbed off clean with a piece of cotton, leaving a brilliant polish. You can carry a can of metal polish to take care of rust or deep tarnish. A charge of 25 cents per job satisfies your customer and brings you a sizeable profit.

Keeping Up Vacant Houses

A Seattle, Washington, university student, faced with the possibility of having to quit school for lack of finances, has convinced owners of vacant homes for rent that a well-cared-for appearance is as much a psychological aid in affecting rentals as it is in selling one's own services. He found, after contacting a number of owners, that they were invariably willing to pay him for keeping up the grounds. He bought a second-hand car and necessary tools, and each evening after classes and all day Saturday he mows lawns and trims hedges, visiting each house on his list once a week.

Money-making Ad Stunt

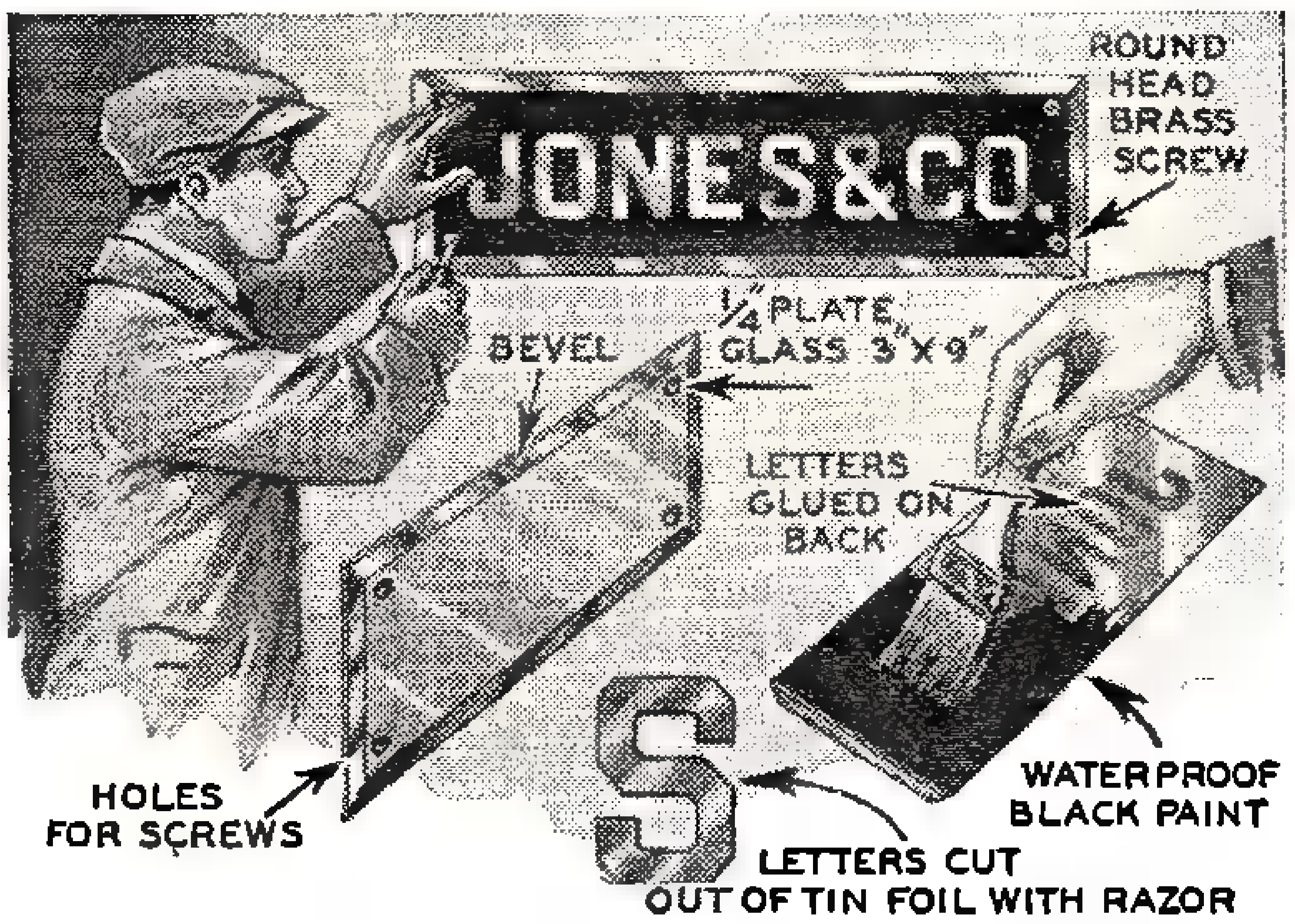
Thirty-five dollars a week is the profit netted by an enterprising Kentucky man from a novel advertising stunt he devised. Here's how you can work it. Find out if there is on the statute books in your state a law requiring hotels to have posted in each room the law governing hotel operation. If this is the case, secure permission from local hotel owners to have some 8x12 in. cards printed with the law set forth in the middle. On the sides of the cards rule off about 20 spaces for advertising and sell them at $2 to $3 each to local merchants. When you've covered your town on this stunt, try your neighboring villages.

Gather Up Pine Cones

If you live in a region where pine trees grow abundantly you've no doubt noticed hundreds of pine cones lying around on the ground in the wooded regions. If you gather up these cones you can sell them to almost any forestry station for one to three dollars a bushel. It's advisable first to contact your forest ranger station to get prices. A good days work, with prices fair, should bring you an income of five to eight dollars.

Glass Signs for Offices

Making and selling glass signs to dentists, doctors, stores, offices, etc., will bring you in a heaping handful of extra dollars. Signs most easily sold bear business names or house addresses and are about 3"x9" in size, $1.50 being a fair price. Signs of larger size can be disposed of at prices up to $5. An accompanying drawing shows how these signs are made. If you are not familiar with lettering, secure a book on the subject from the library. Lettering is made from tin foil cut out with a razor blade and pasted on with transparent glue. The bevel-



ing of the glass is done with an ordinary file, and the drilling with a broken off drill. When soliciting customers you'll boost business by carrying a sample of your work.

Installing Glass Windows

A factory man who lost his job at the beginning of the depression now makes a good living for his family of seven by repairing, puttying, and installing new glass in windows, mirrors, cupboard and book case glass doors. First he called on a wholesale plate glass company where he obtained all the glass he wanted, provided he bought a certain quantity at a time. Armed with his wholesale list, he took orders till the stipulated quantity was covered. Then with his glass fastened to one running board and two second hand ladders on the other, he set out to install the pieces. For three years now he has been earning a good living from a growing list of satisfied customers.

Circular Delivery Route

Contracting to deliver circulars for mercantile firms at a flat rate per thousand has been the source of steady employment to many men suddenly thrown out of work by the depression. The plan usually employed is to contact prospects with quotation of rates. A thorough canvass of business houses in your community should be the first step. Your delivery system should be planned according to districts, with the approximate number of homes in each district tabulated for the convenience of the advertiser. When merchants are convinced you are reliable, it will mean steady employment.

Classified Mailing List

Names and addresses of a mailing list are of little value unless they are classified. If for instance it is known that John Doe is interested in music and buys his supplies by mail, his name would be valuable to a mail order house publishing music. Procuring data such as this for a mailing list is a highly profitable job. You can obtain names by sending out circulars offering a premium to persons sending in names and addresses from their locality. Explain in your circular that you want to mail out advertising. Lists of these names with adequate data furnished to mail order houses will bring you $1.00 to $3.50 per 500.

Indexed Recipe Books

A former typist now earns her living by providing the housewife with a systematic means of keeping "pet" recipes. For $2 she will furnish a card-case, a set of twenty-five index cards, and will type on cards to fit the case any 50 recipes. Additional recipes she will do for 2 cents each. She purchases the card-cases at 50 cents each, the set of index cards at 25 cents, and the cards at 10 cents per 100. Her earnings average around $20 a week and are growing, because housewives recognize the convenience of having family recipes.

Advertising for Theatres

In towns where there are several theatres changing their bills twice or three times a week, a handy amusement guide can be published each week to bring you a "hard times income." These guides are placed near cashiers in restaurants, drug stores, hotels, soda fountains, in fact, anywhere people can get at them. On the guide are small panels in which are inserted advertisements solicited from beauty parlors, restaurants, taxi lines, night clubs, etc., while in the center is the current program of all the town's theatres. It's advisable to use colored paper and colored ink thus giving a flash piece to attract the eye.

Salvaging Used Containers

Making a living out of cast-off pickle bottles, jelly jars, condiment containers, etc., may seem far fetched, but one woman manages to support a family of four in this way. Being handy with a paint brush, though entirely untrained, she collects these cast-off articles and decorates them to make attractive vases, lampshades, console sets, kitchen sets, etc. Her unemployed husband makes daily visits to hotels and restaurants in search of used containers of attractive contour. They are placed with florists, gift shops and novelty stores on commission. She has gradually branched out until she is now busy all the time.

Start a "Worm Farm"

A Canadian earns a good living in the fishing season by supplying fishermen, sporting goods stores and summer resorts with live fresh worms regularly twice a week, put up in lots of 25, 50 or 100 in cardboard boxes. The worms are raised in wooden pails filled three quarters full of soil, into which is mixed twice a week a small quantity of corn meal and coffee grounds. The worms multiply so rapidly on this food that a dozen or so containers will furnish enough worms for one season. They can be sold direct to fishermen at 60 to 75 cents per hundred, and to stores at $1 per hundred. It's advisable to make the rounds on your route each Friday morning so as to provide fresh bait for Saturday and Sunday.

Whitewashing Basements

Neighbors viewing a neat white washing job done by a Wesleyville, Penn., man were the first customers in a basement whitewashing business that has proven surprisingly lucrative. Three dollars was the price charged for each job—a price that most any home owner is willing to pay. Materials, which are furnished by you, are: one ten-quart pail, a good brush, twenty pounds of white wash lime. Stock a few burlap bags to put on the floor to keep it clean.

Watch for Motorbike Smashups

Smashed motorcycles can be rebuilt to yield a profit by a mechanic who knows his motorbikes. Bikes that have been in accidents are grist for your mill, so it's advisable to keep a lookout for smashups. A Des Planes, Illinois, man who earns extra income this way recently made a profit of $35 on one job. He bought the wreck for $15, spent $10 for repair materials and sold the rebuilt machine for $60. The overhauling took only three weeks of spare time.

Basement Battery Shop

An ex-garage worker, thrown out of work two years ago, now has a thriving battery business which he carries on in his basement. He makes the rounds of garages, junk-yards, etc., picking up old batteries for 50 cents apiece. These are then rebuilt and sold for two dollars, taking the old battery as a trade-in, which is then rebuilt and sold again. A few hundred cards passed around to auto owners will bring you a good supply of customers. The library will supply you with books on battery repairing.

Help on Moving Day

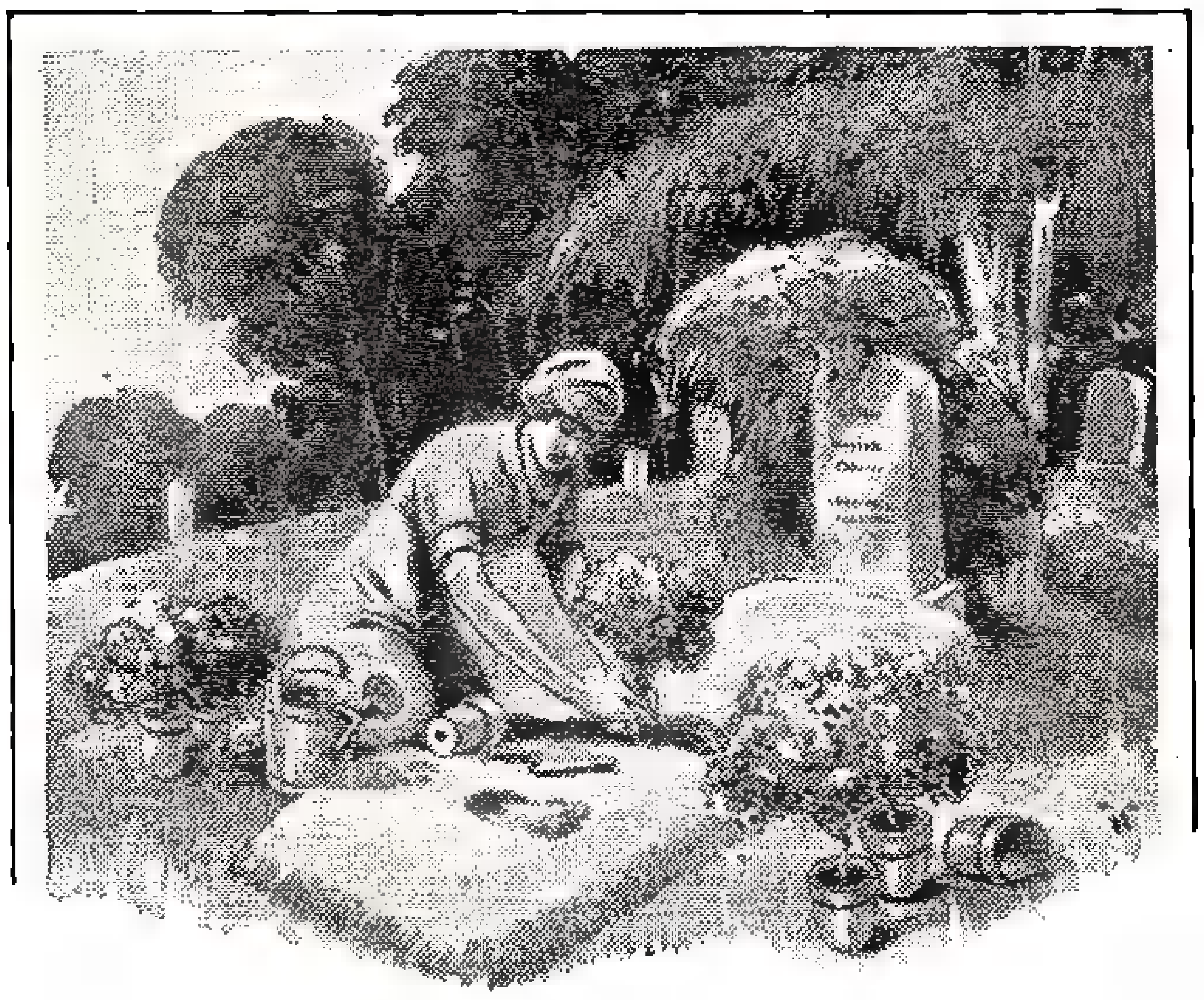
People who are moving into new homes would generally like to have someone to help them straighten up. You can take advantage of this need by contacting moving companies and finding out who is moving, and then soliciting the movers, asking that for a reasonable price you be allowed to meet them at their destination, straighten up, wash windows, beat rugs, and aid in all tasks incidental to the shake-up. A Wisconsin man who works this idea averages five days work a week.

Money in Rough Rock

Homeowners who like to decorate their yards with rough rock walks, rock gardens, rock-lined fish pools, and rock walls will prove a lucrative source of income for you if you have an idle truck and can scour the countryside for rough rock. Most farmers whose lands are afflicted with boulders will be glad to give or sell them to you—anything to get rid of them. You can contract with your customers to provide them with rock, and even build the ornaments yourself.

CASH FOR MONEY-MAKING IDEAS!

Have you worked out some ingenious, practical way of making money, either as a full-time job or a spare time activity? Perhaps some friend or neighbor, thrown out of work, has used his wits to devise some money-making scheme which brings better returns than the job he lost—this very thing has happened so often recently that many men look on depression as a blessing in disguise. For all accounts used in this money-making department of the magazine, payment will be made at regular rates. Contributions will not be returned unless postage is enclosed. Keep your article brief, and address it to Modern Mechanix and Inventions, 529 S. Seventh Street, Minneapolis, Minn.



Profits in a Cemetery

An enterprising widow supports herself and her small child by decorating graves that have become run down because of neglect. She first wrote relatives and children of the deceased, describing the unsightly conditions of the mounds and offering to care for them for a few dollars a year. A surprising number of people living far away but yet desirous of honoring the dead with a well-kept grave were glad to avail themselves of the widow's services. She clipped the grass regularly, planted flowers, and occasionally replaced a headstone or monument. On holidays she decorated the graves with wild flowers, and in general kept them in a neat condition.

Income for Painters

A painter who lately lost his job in Washington hit upon this idea by which he could start a business of his own. With a can of varnish, a paint brush and some old rags he started out to canvass the neighborhood around his home. Calling at each house he asked if he might varnish their front doors at 25 cents each. Doing this he was able to make about $2.50 daily working 8 to 10 hours. At each house where work was done he left his name and address in case they wanted more work done. In two months his business was so good that he hired a painter and says it's easy to make $30 weekly with a growing business.

Sell Home Photographs

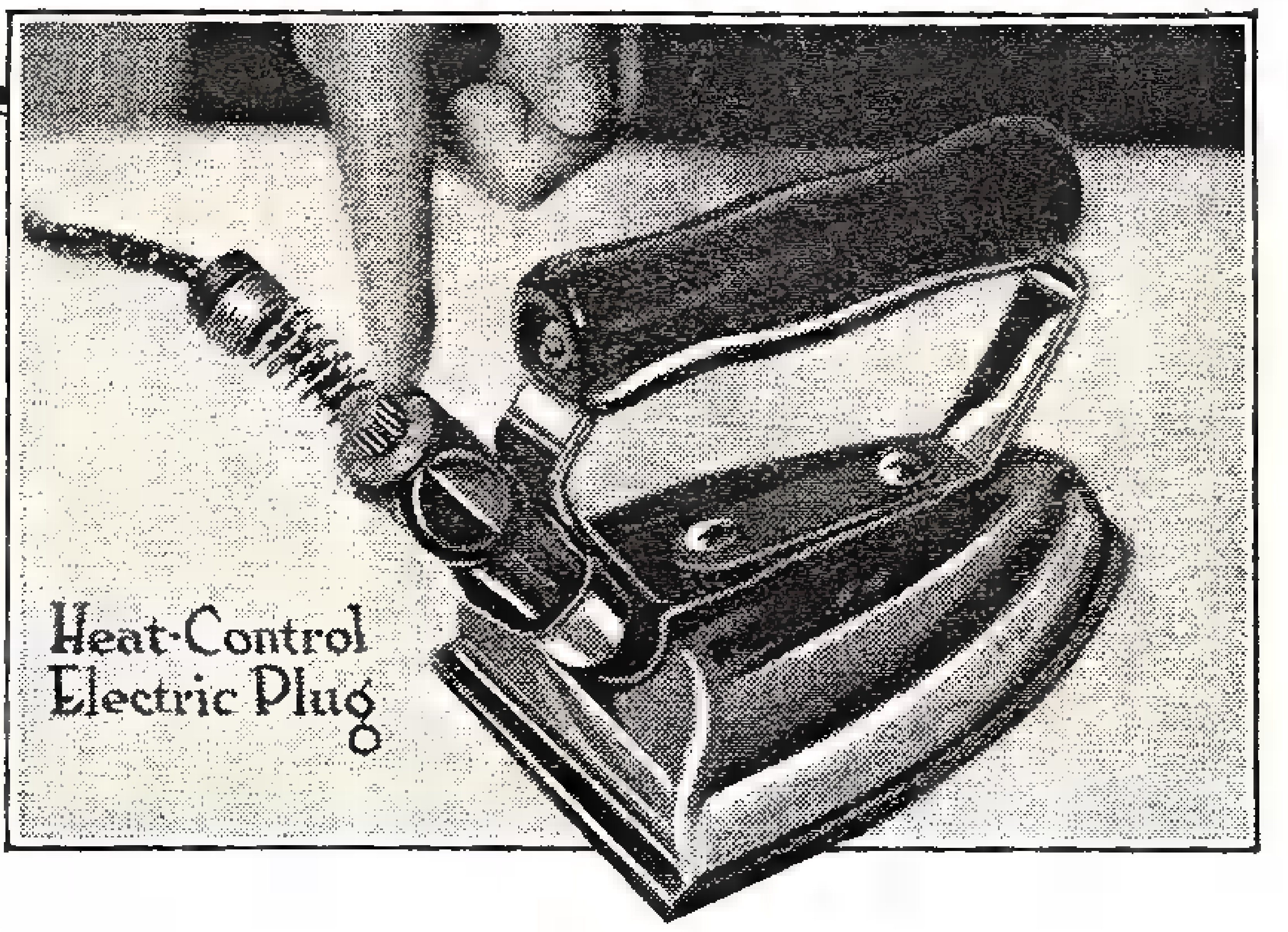
An unemployed photographer makes enough money each week to support his family nicely. Here is his method. He takes pictures of houses, preferably small bungalows where it is easily seen that the owner is proud of his home. He develops the pictures himself, then mounts each on a piece

(Continued on page 19)

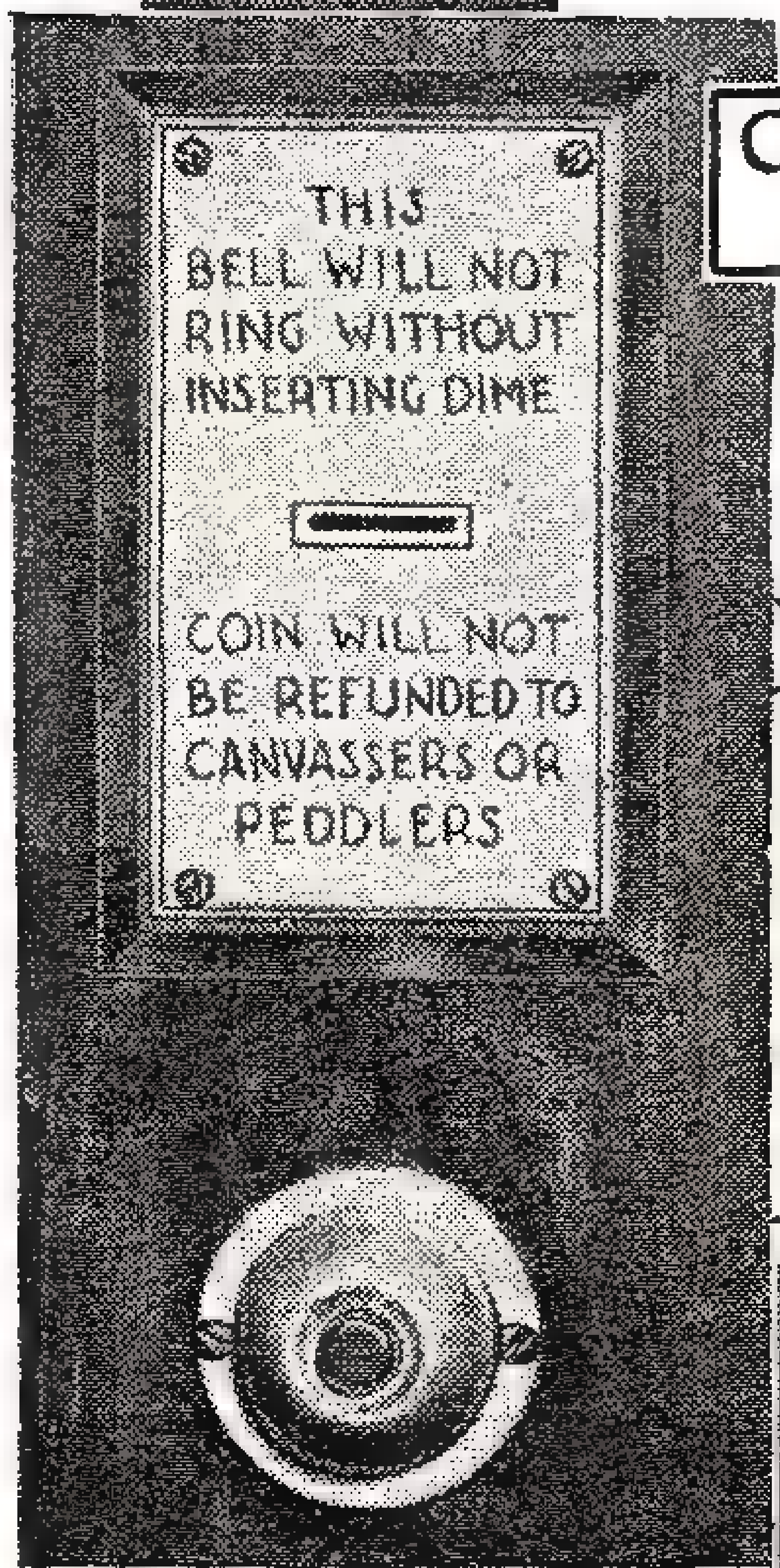
Mechanical Aids Make Life

Ultra-Violet
Health Lamp

You can convert your bridge lamp into an ultra-violet lamp with a special transformer and socket adapter now on the market. The sun-bulb is inserted in a special reflector which fits lamp socket. Turn of switch floods room with health-giving rays.


Heat-Control
Electric Plug

Temperature control for electric iron, percolator, heater, etc., is provided with this plug having rheostat to govern current flow. Six degrees of heat are at absolute control of the operator.


Coin-in-Slot
Lock
THIS
BELL WILL NOT
RING WITHOUT
INSERTING DIME
COIN WILL NOT
BE REFUNDED TO
CANVASSERS OR
PEDDLERS

Inserting coin in slot of this unique lock opens door. Coin is refunded when housewife admits you. Plate is put over slot when you go out.

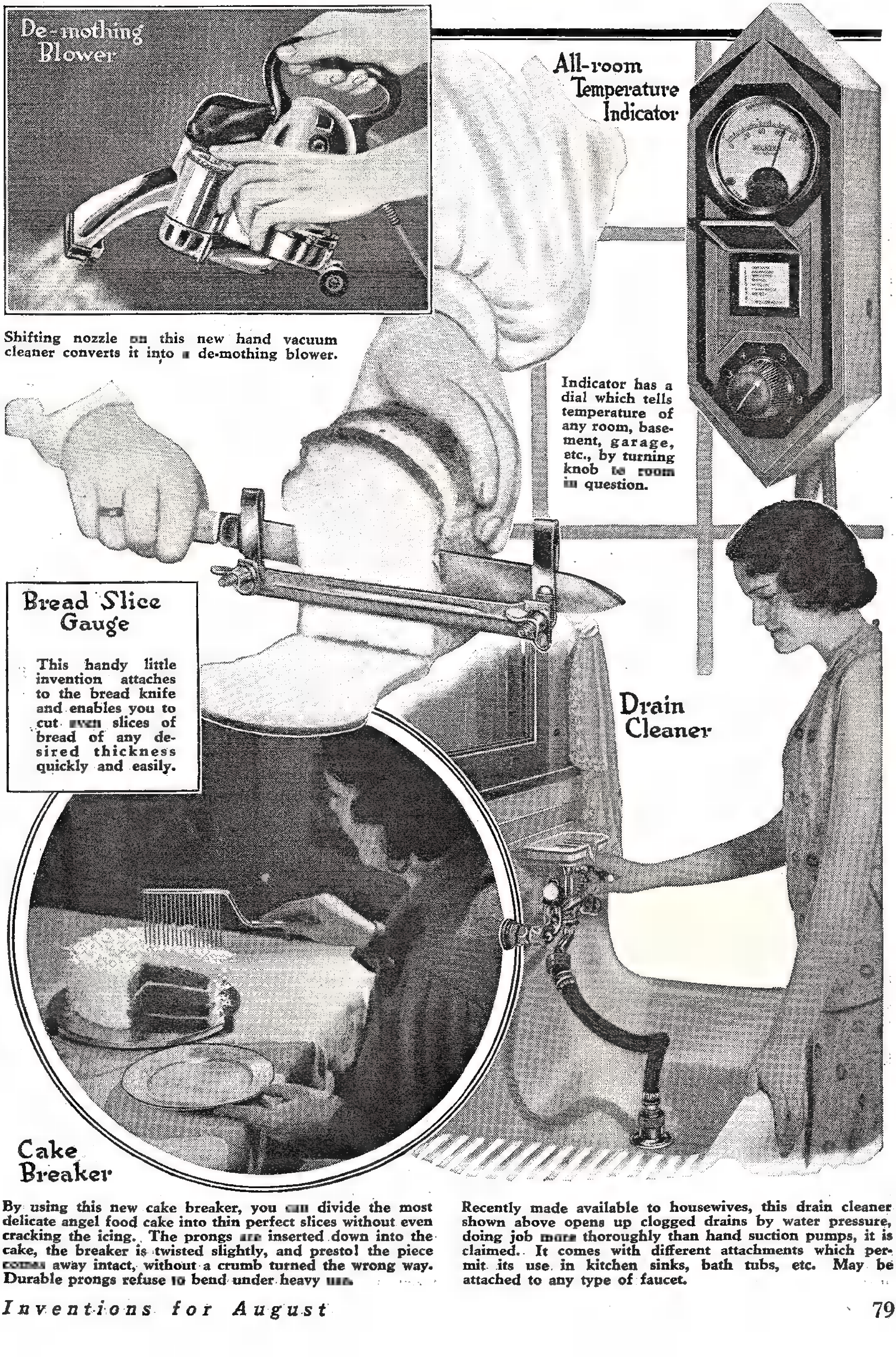
Pea and
Bean Sheller

Labor of shelling peas is reduced to absolute minimum with this automatic sheller now on market. The peas are fed into the hopper with the left hand while the crank is turned with the right. The peas or beans roll out into the dish while the empty pods drop on the other side. Clamps to table as shown, and does a clean job of removing strings and separating peas and pods.

Midget
Bowling
Alley

Like everything else, bowling is being deflated too. For instance look at the photo above. Here is a midget bowling alley now on the market which is lots of fun for a quiet little game at home. It's played pretty much like the regular "ten-pin" game at the big bowling alleys. Ball is slightly larger than a baseball and it rolls back to you in a groove just as in regular game.

Easier for the HOUSEWIFE



De-mothing Blower

Shifting nozzle on this new hand vacuum cleaner converts it into a de-mothing blower.

All-room Temperature Indicator

Indicator has a dial which tells temperature of any room, basement, garage, etc., by turning knob to room in question.

Bread Slice Gauge

This handy little invention attaches to the bread knife and enables you to cut even slices of bread of any desired thickness quickly and easily.

Drain Cleaner

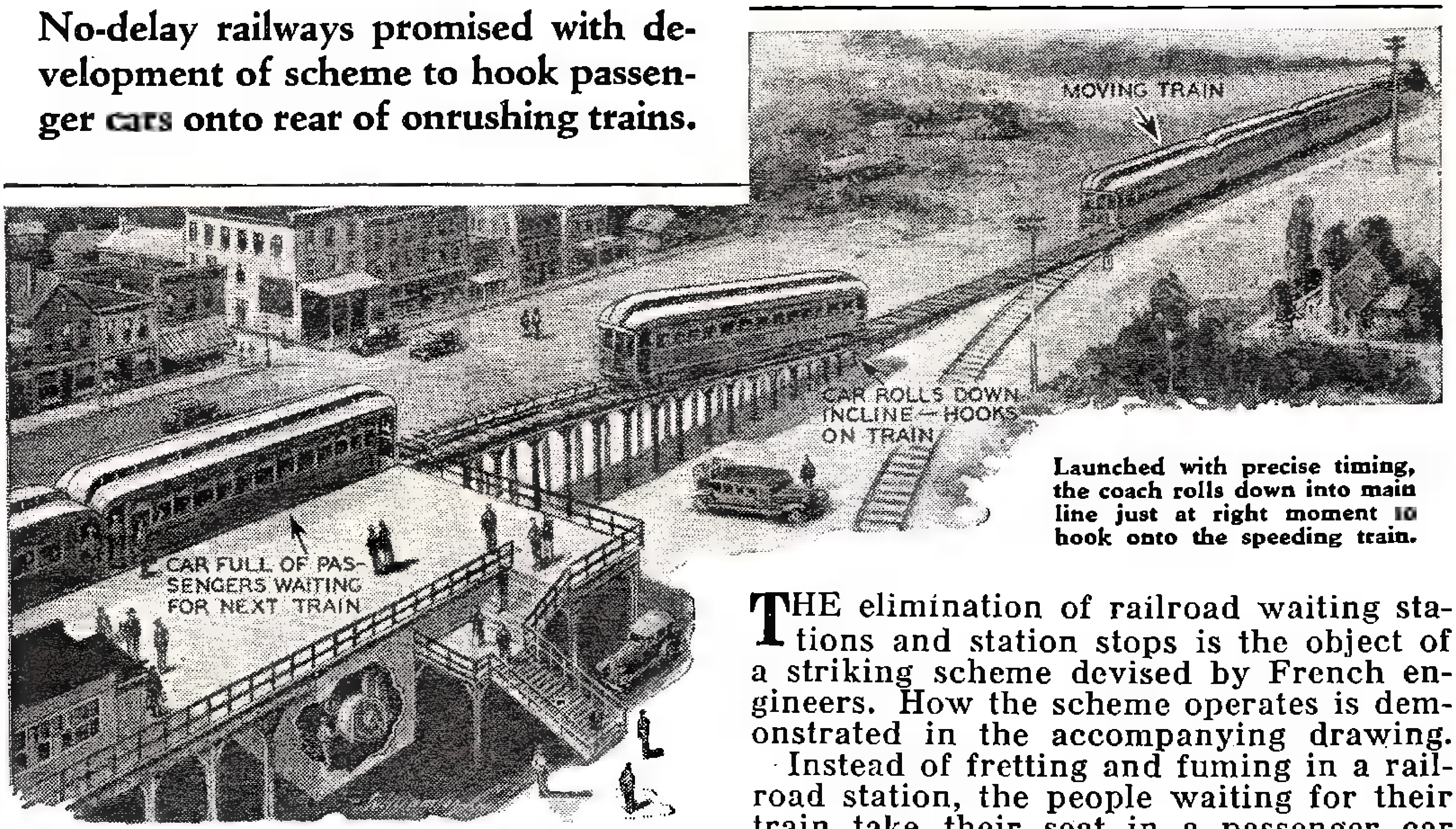
Cake Breaker

By using this new cake breaker, you can divide the most delicate angel food cake into thin perfect slices without even cracking the icing. The prongs are inserted down into the cake, the breaker is twisted slightly, and presto! the piece comes away intact, without a crumb turned the wrong way. Durable prongs refuse to bend under heavy use.

Recently made available to housewives, this drain cleaner shown above opens up clogged drains by water pressure, doing job more thoroughly than hand suction pumps, it is claimed. It comes with different attachments which permit its use in kitchen sinks, bath tubs, etc. May be attached to any type of faucet.

Coaches Are Waiting Rooms on Non-stop Railway Project

No-delay railways promised with development of scheme to hook passenger cars onto rear of onrushing trains.


MOVING TRAIN
CAR ROLLS DOWN INCLINE—HOOKS ON TRAIN
CAR FULL OF PASSENGERS WAITING FOR NEXT TRAIN

Launched with precise timing, the coach rolls down into main line just at right moment to hook onto the speeding train.

Passengers wait in coach for their train. When it passes station master launches the car down incline as illustrated.

THE elimination of railroad waiting stations and station stops is the object of a striking scheme devised by French engineers. How the scheme operates is demonstrated in the accompanying drawing.

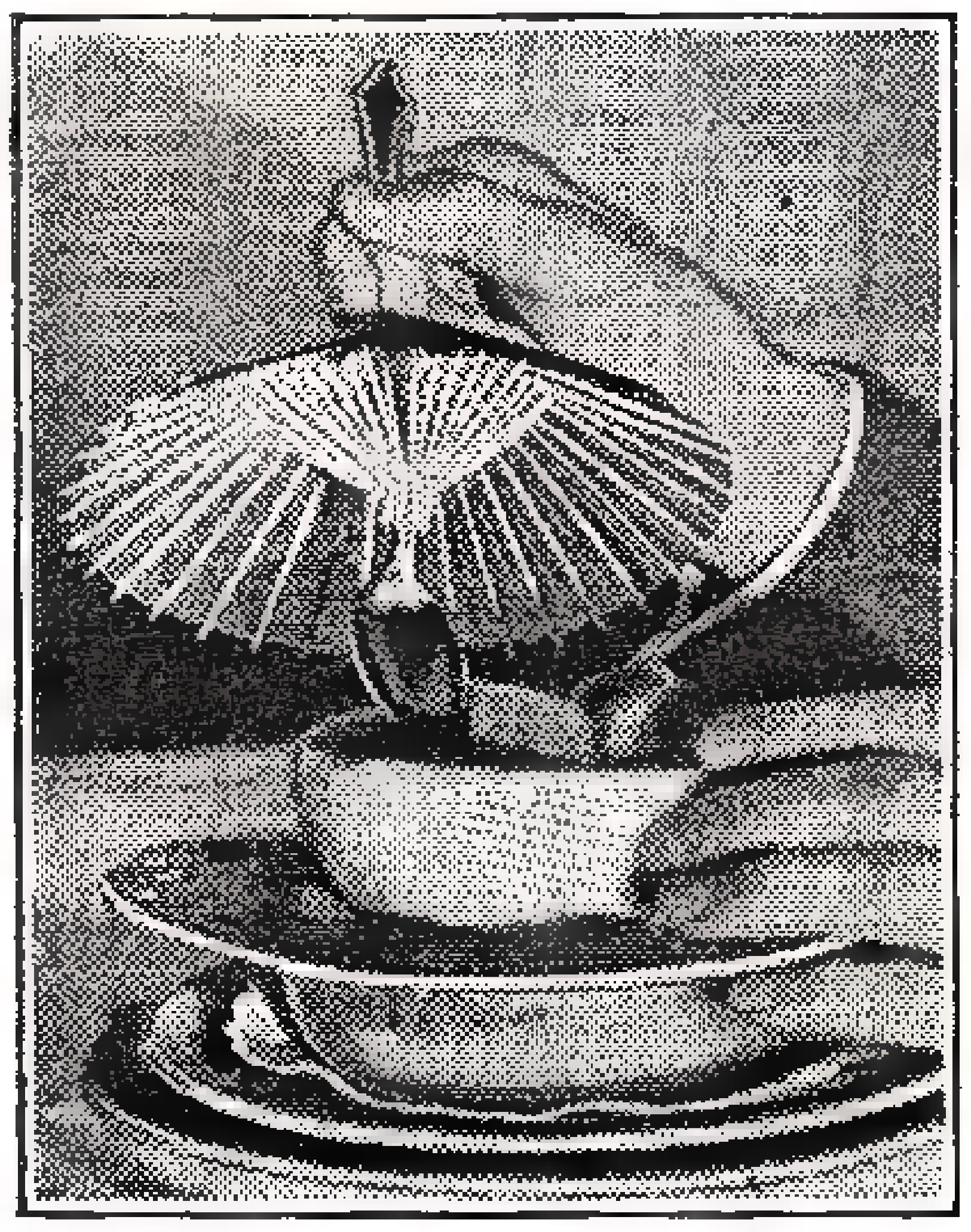
Instead of fretting and fuming in a railroad station, the people waiting for their train take their seat in a passenger car waiting on an elevated side track. Then when the train comes along, the station master releases the car, which slides down an inclined track. Momentum carries the car onto the main line, where it couples onto the rear of the onrushing train.

U. S. Had World's Hottest Spot

THE United States may possess, after all, the hottest spot on earth. At Furnace Creek Ranch, in the famous Death Valley, regular weather records have been kept since 1911. The hottest day recorded was July 10, 1913, when the temperature reached 134 degrees.

Nine years later, however, French observers at Azizia, on the edge of the Sahara Desert in Africa, recorded an air temperature of 136 degrees, two degrees above the Death Valley record. However, the weather station in Death Valley is 98 feet above the Valley's bottom. Accordingly the deepest part of the Valley probably is several degrees hotter than the weather station—at least 137 degrees.

Grapefruit Conquered at Last



Umbrella-shaped shield opens to protect you from grapefruit.

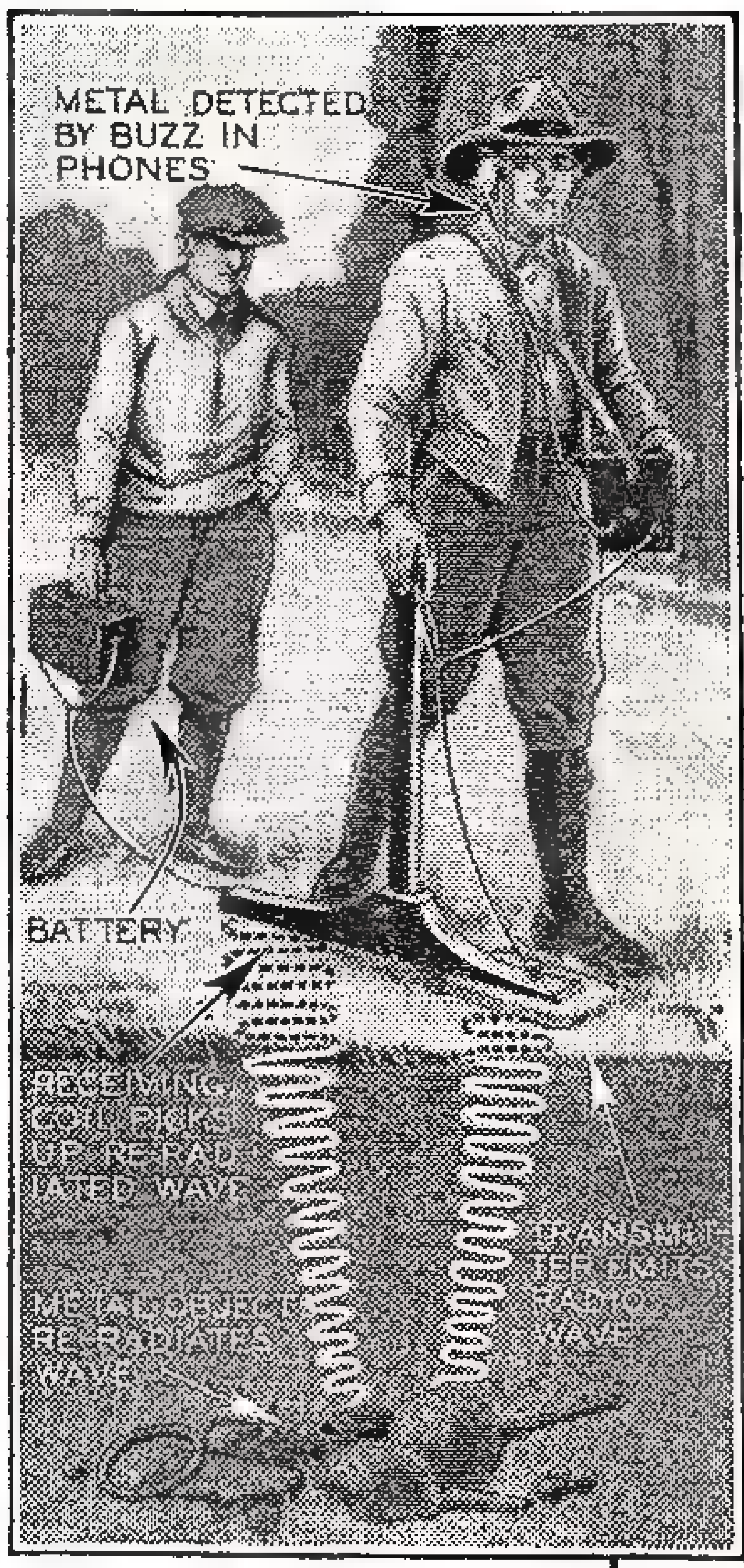
AT LAST the grapefruit has been conquered. The weapon employed in the conquest is an "umbrella spoon," shown at left, which automatically opens into a large shield when you gouge down into the meat of the fruit. When you raise the spoon to your mouth the shield closes.

Converts Sew Machine to Jig Saw

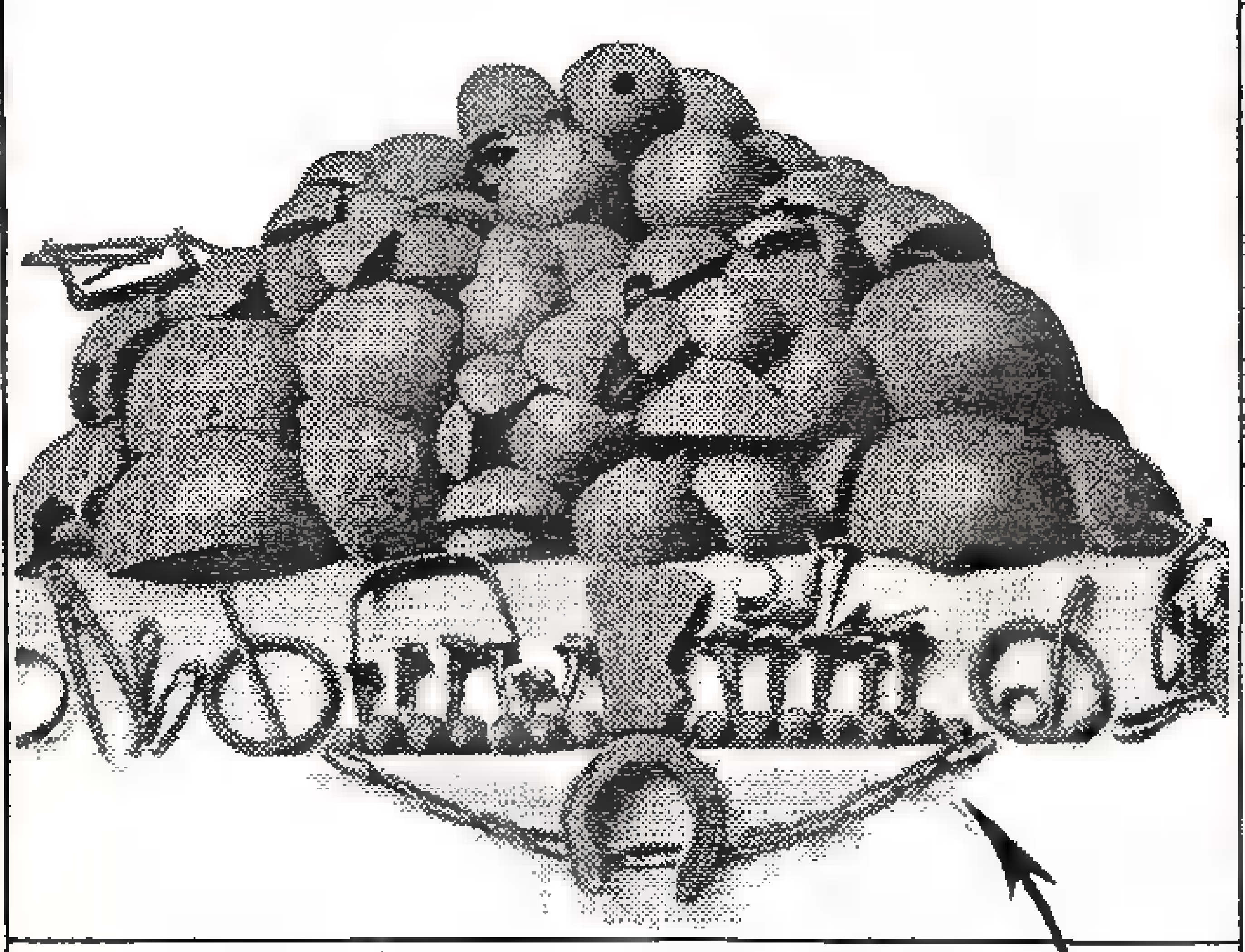
THE rear guard of the jig saw puzzle fans will be interested in an attachment which hooks to a sewing machine to convert it into a jig saw. The device cuts wood up to ¾ inch thick and can be installed or removed in a fraction of a second.

Attachment for sewing machine converts it into jig saw to cut out jig-saw puzzles. Handles wood up to ¾" thickness.

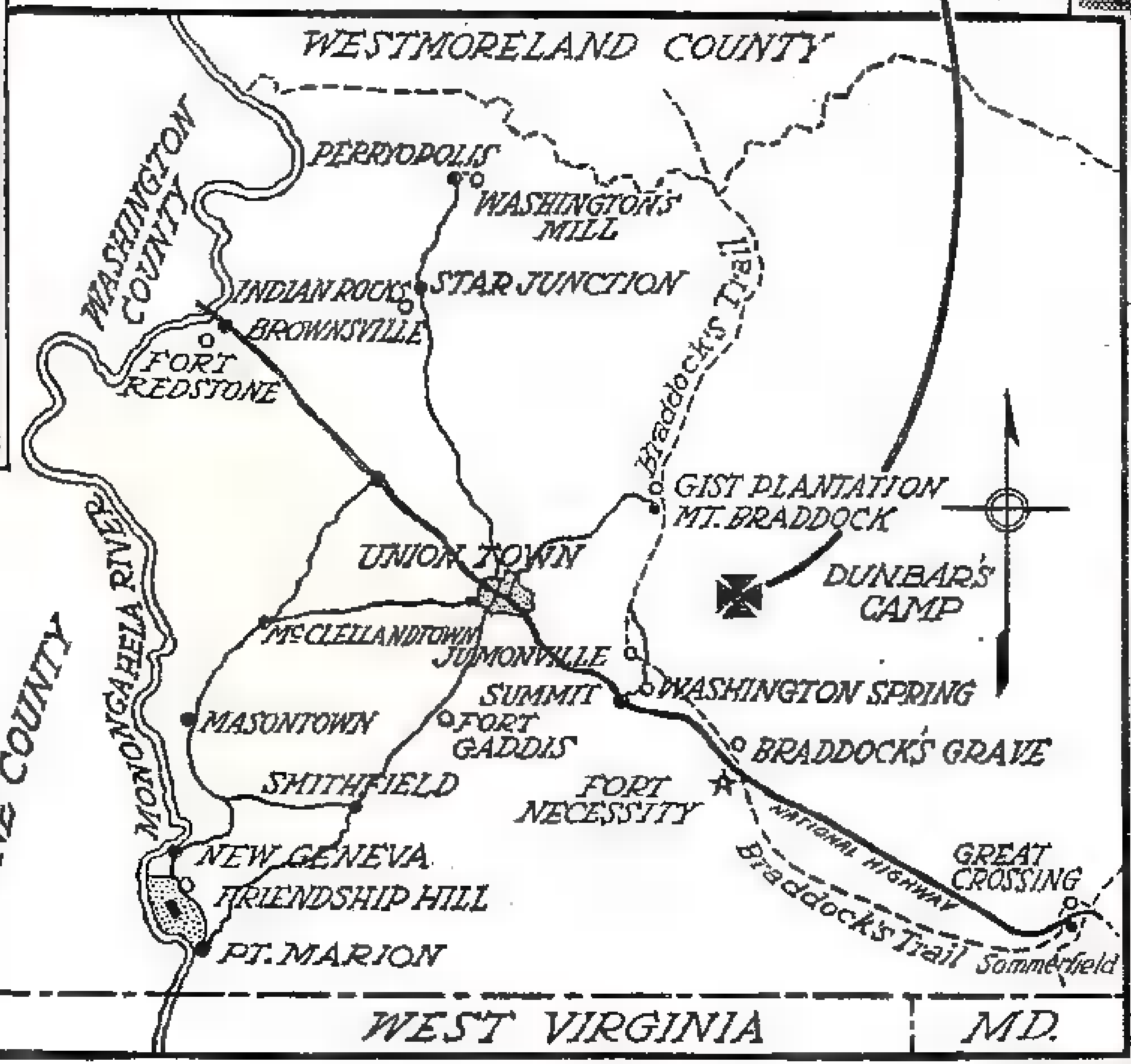
Radio Divining Rod Finds Historic Treasure


METAL DETECTED BY BUZZ IN PHONES
BATTERY
RECEIVING COIL PICKS UP RE-RADIATED WAVE
TRANSMITTER EMITS RADIO WAVE
METAL OBJECT RE-RADIATES WAVE

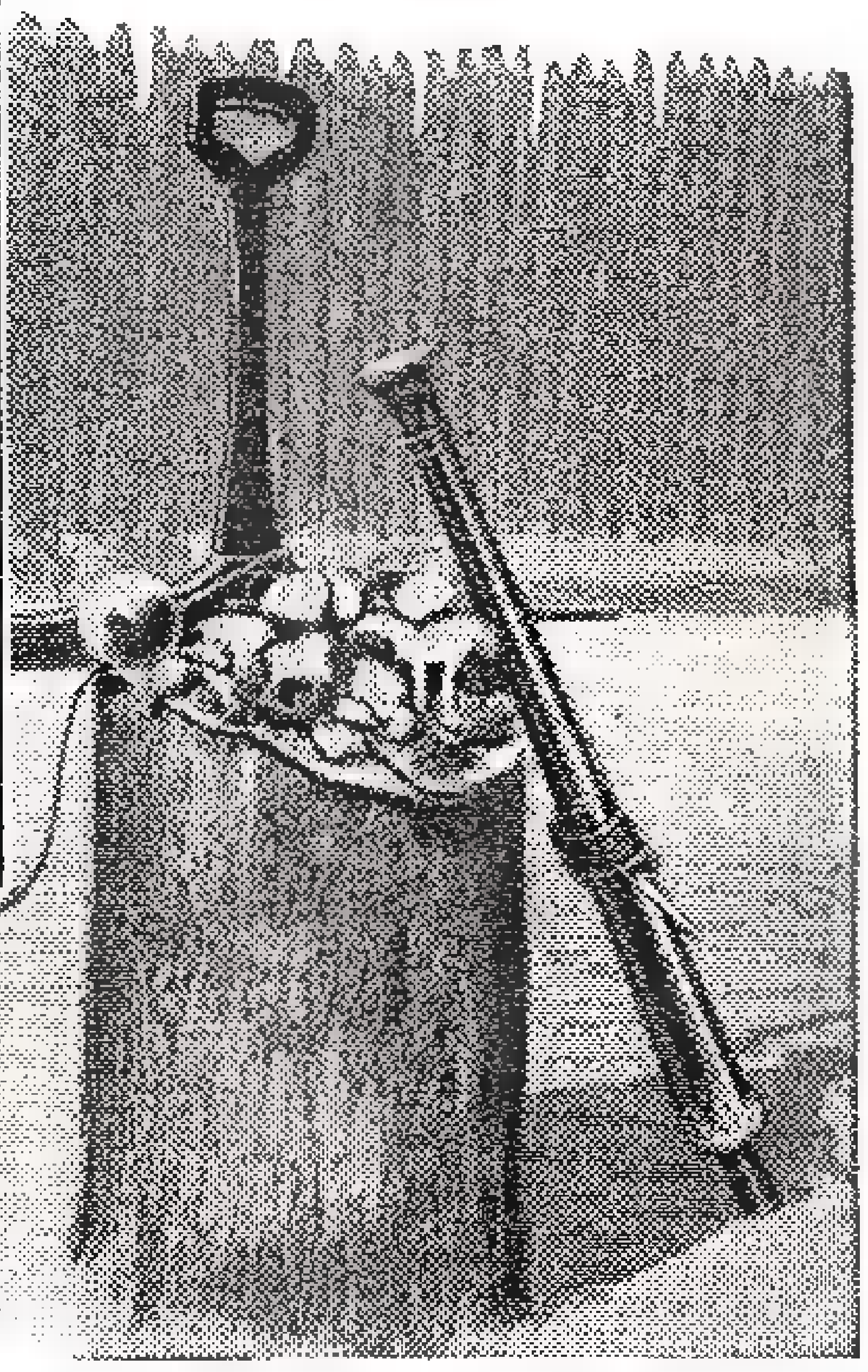
Operation of the treasure finder is illustrated here. Long radio waves radiated from the transmitting coil penetrate the earth, and when they strike metal objects they are reradiated and picked up by the receiving coil. Presence of metal is registered in the phones by a distinct tonal buzz. Amplifier and battery are carried by an assistant.



Broken shells, horseshoes, and old guns unearthed after being located by finder.


WESTMORELAND COUNTY
WASHINGTON COUNTY
PERRYOPOLIS
WASHINGTON'S MILL
INDIAN ROCKS
STAR JUNCTION
BROWNSVILLE
FORT REDSTONE
Braddock's Trail
GIST PLANTATION
MT. BRADDOCK
DUNBAR'S CAMP
UNION TOWN
McCLELLANDTOWN
JUMONVILLE
SUMMIT
WASHINGTON SPRING
MASONTOWN
FORT GADDIS
BRADDOCK'S GRAVE
SMITHFIELD
FORT NECESSITY
NATIONAL HIGHWAY
GREAT CROSSING
MONONGAHELA RIVER
GREENE COUNTY
NEW GENEVA
FRIENDSHIP HILL
PT. MARION
Braddock's Trail
Sommerfield
WEST VIRGINIA
MD.

Prof. R. B. Abbott, inventor of the treasure finder.



Map above shows locale of treasure find — Dunbar's camp where Gen. Braddock made hasty retreat, leaving cannon, shells shown at right.

MODERN SCIENCE has joined with the historian in providing a simple foolproof, portable instrument that eliminates guesswork in locating historical relics, buried treasure, and other hidden metallic objects.

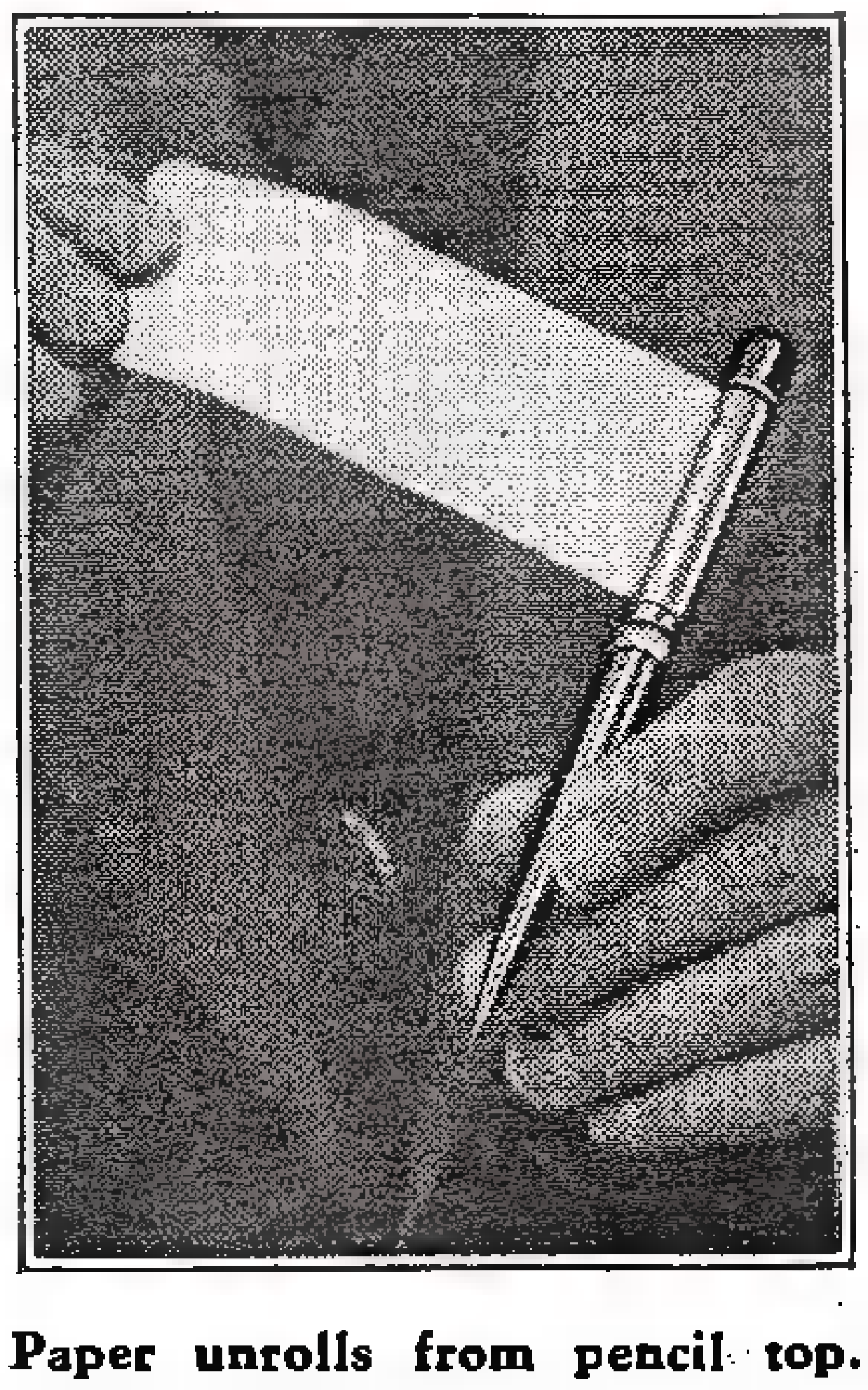
The device, which has already been employed with astonishing success in a number of projects, was developed by Prof. R. B. Abbott of the Purdue University physics department. It is in reality a simplified sending and receiving outfit with which the operator "feels" out the ground.

During the feeling procedure, the transmitting coil emits a long wave that penetrates the ground to locate the buried metal. When the wave strikes any metal objects, it is reradiated and picked up by the receiving coil. A distinct tonal buzz then sounds out in the earphones notifying the operator he is over a metal.

The instrument proved its practicability recently when it located a number of old cannon, broken shells, and various other pieces of military equipment which had been abandoned back in 1775 by General Braddock when he was compelled to make a hasty get-away from the Colonial army.

Pencil Carries Own Tablet

LATEST in writing convenience is a pencil that carries its own tablet right along with it. This tablet is a roll of paper in the top of the pencil which may be unwound and torn off when you feel the urge to write. When one roll has been used up new filler rolls are set in place. One roll holds 10 feet of paper.

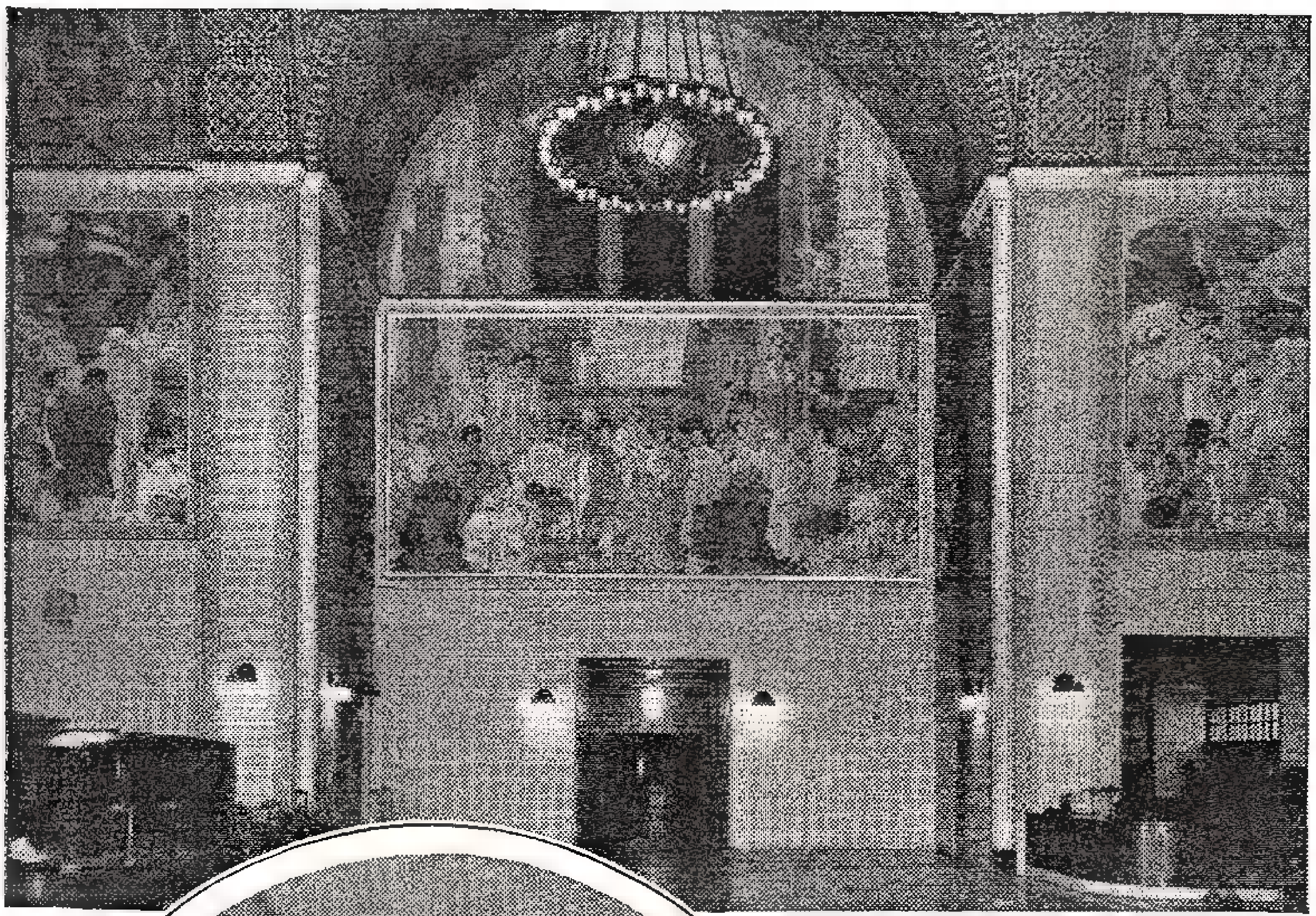


Paper unrolls from pencil top.

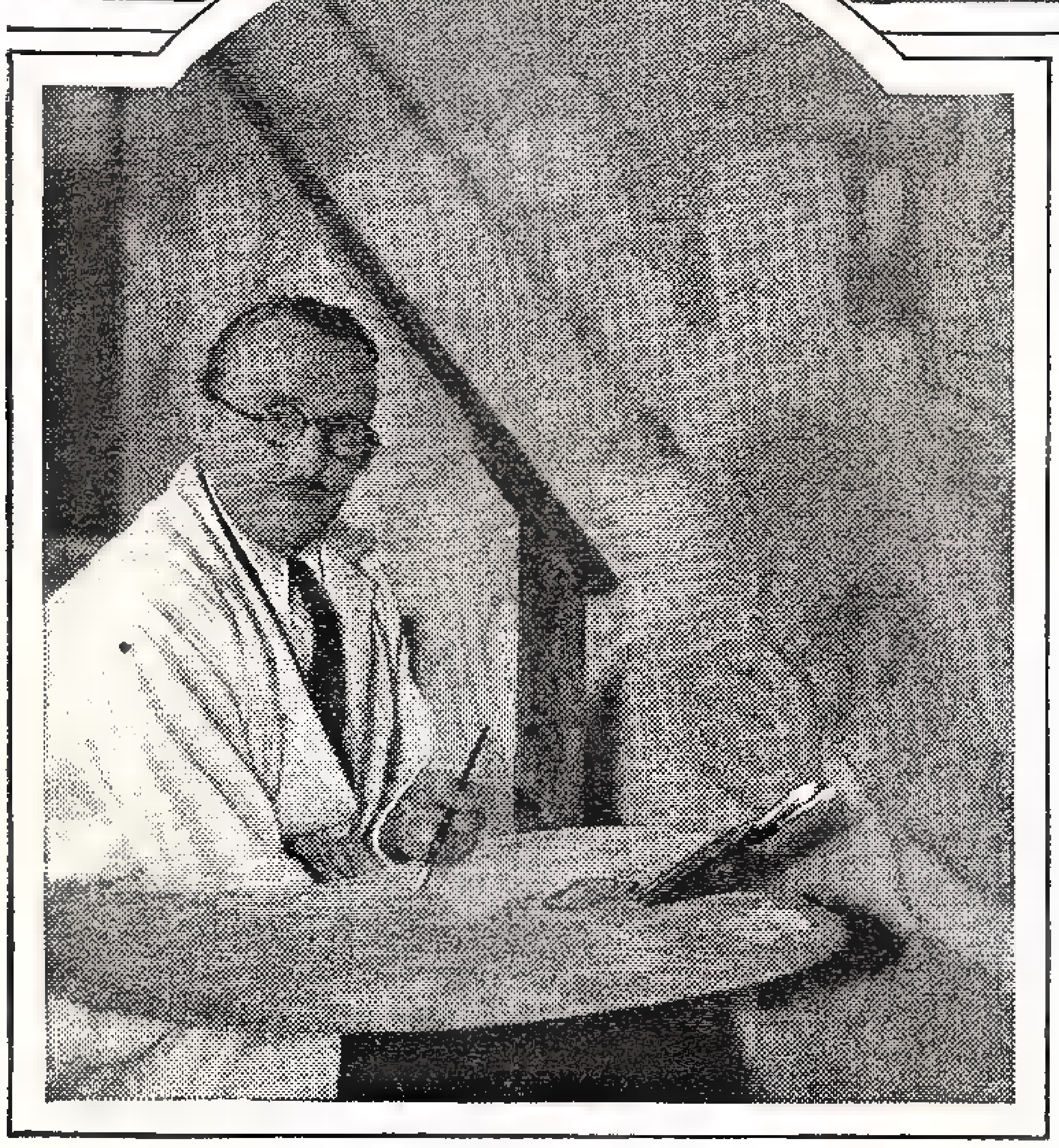
MECHANICS Aid Art to

by DON BLACK

It seems a far cry from mechanical engineering to the esthetic intricacies of an oil painting, but the mural masterpieces of Dean Cornwell just hung in the Los Angeles Library would have been impossible if the mechanic and artist had not worked hand in hand. Methods employed in fabricating these paintings are described here.



View of the Los Angeles Central Library lobby with the Cornwell murals in place. White lead binds them to the wall.



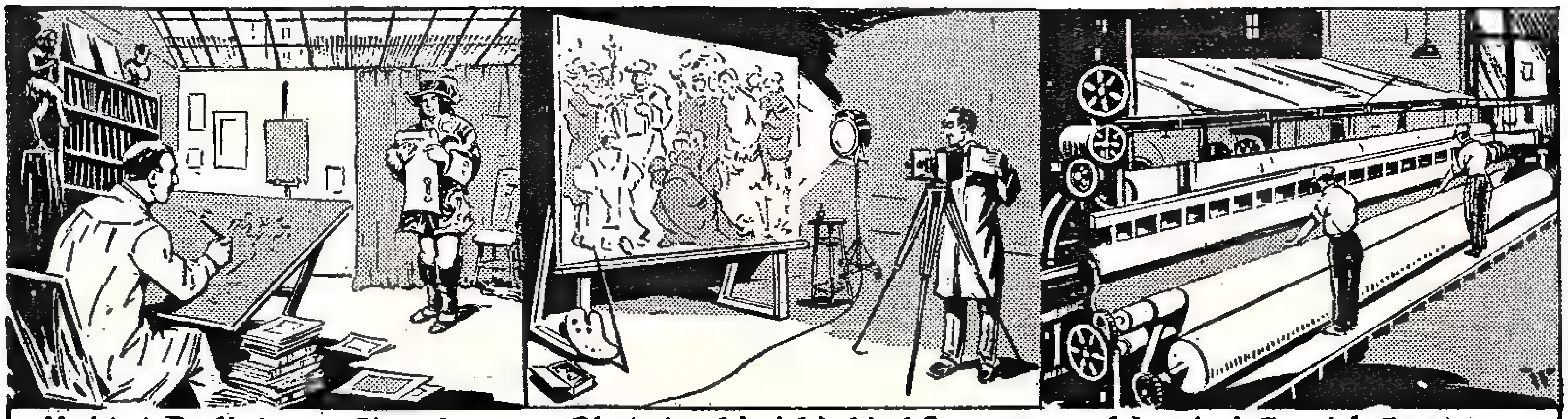
Dean Cornwell, distinguished artist, who created the mural masterpieces along unique lines. Five full years were required to plan and complete the murals, which comprise twelve paintings containing some 300 human figures.

DEAN CORNWELL, internationally famous young artist, has just completed the world's largest mural paintings. Today they hang on walls of the Los Angeles Central Library, a colorful and arresting tribute to the esthetic genius of this man and a challenge to posterity.

But of the thousands who will linger before them in awe and admiration, few will ever realize that these vivid panels depicting the early history of California are more than an artistic triumph, that the finished work represents also a distinct achievement in mechanical engineering.

For an explanation of this statement, a proper conception of the physical elements involved is essential.

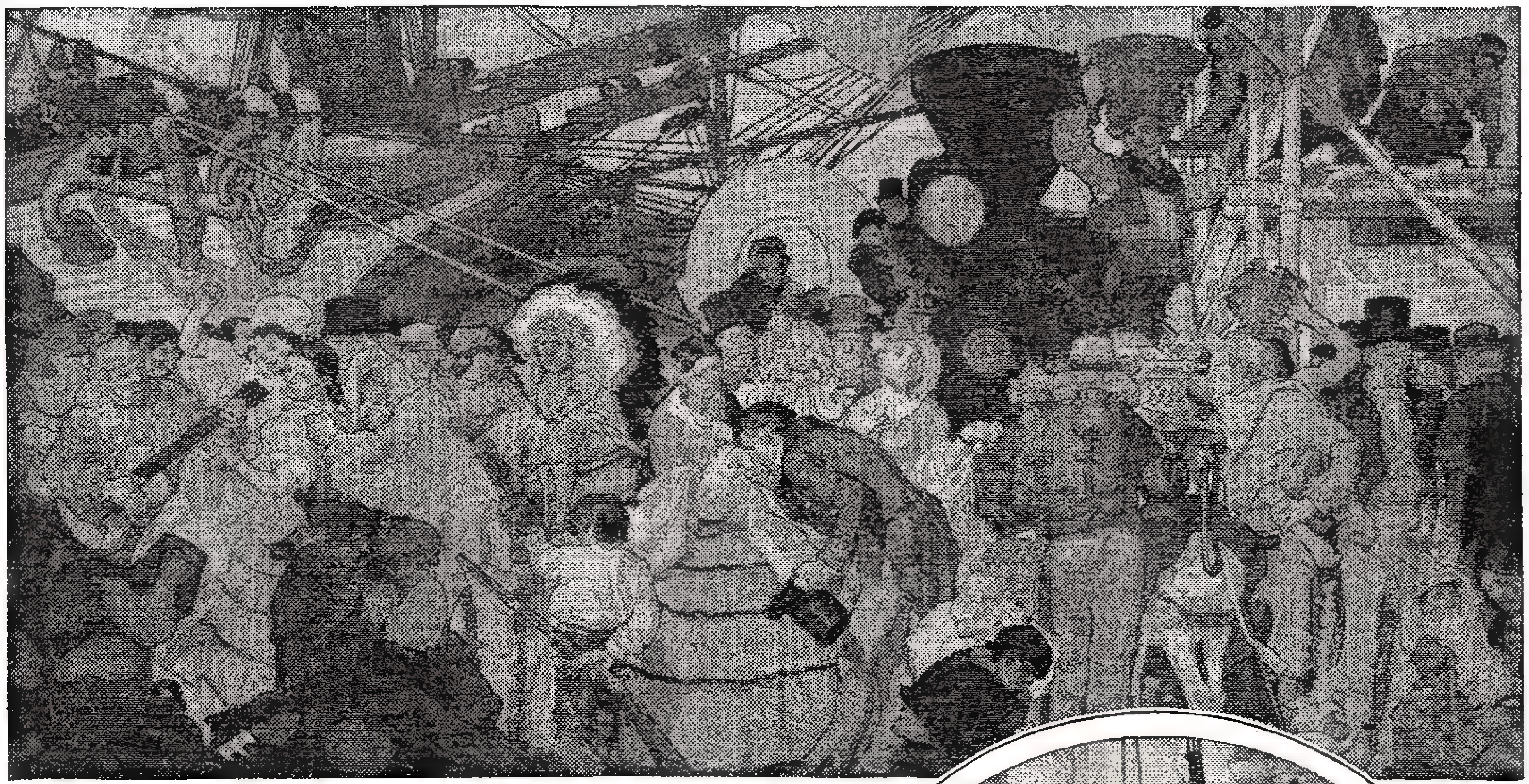
In the first place, with a combined total area of 9,000 square feet, these murals dwarf in size the most ambitious efforts of previous masters. Four of the twelve



Making Preliminary Sketches Photographing Working Cartoon Weaving Special Canvas

Step by step process of making the murals. A thousand preliminary sketches were made from living models, then these individual sketches were arranged in ordered groupings and photographed. Canvas, woven in Belgium, cost $25,000.

Create Mural Masterpieces



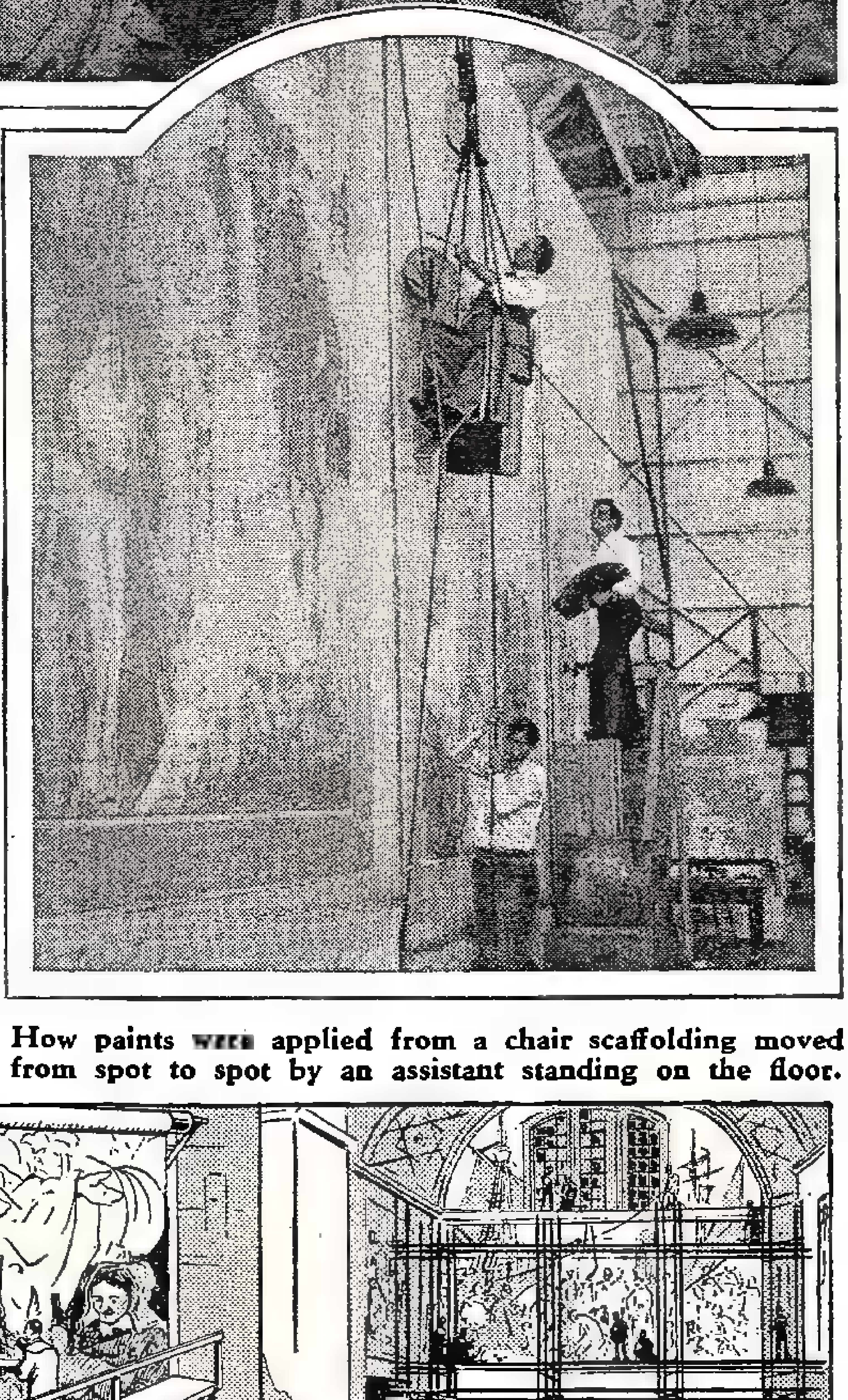
Section of one of the large paintings. Colors in the originals were carefully chosen for harmony with the library background as well as within the painting itself.

paintings are 40 by 40 feet square, the lesser eight panels being 20 by 40 feet.

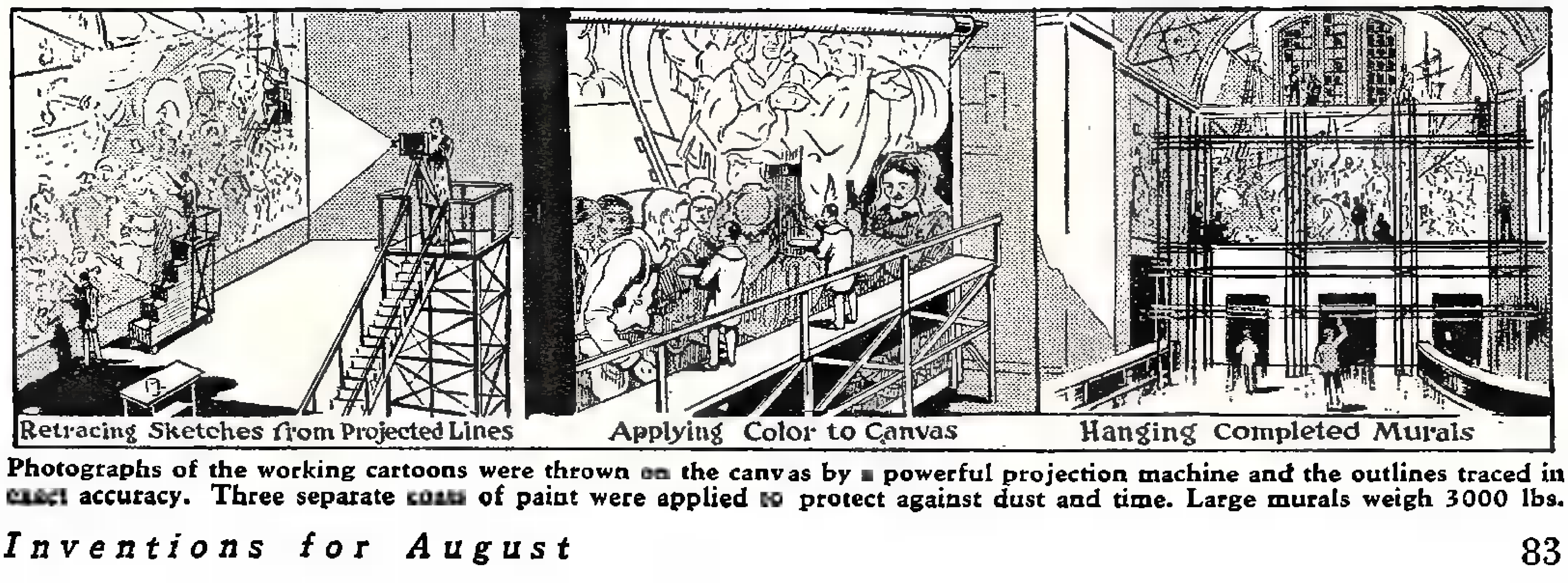
Ready for mounting on walls of the library rotunda, the smaller pictures weigh an even ton, the four major canvasses 3,000 pounds each. More than 300 pounds of liquid blue paint was required to paint skies alone. A total of 100 living models posed for the artist's preliminary sketches, while the completed murals contain approximately 300 human figures.

Three separate and duplicate coats of paint were applied as a protection against cleaning, dust, light and the ravages of time. Finally, it took five full years of painstaking, unremitting toil to complete the task.

When awarded the contract in 1927, Cornwell's first step was an exhaustive research to which months were devoted. When thoroughly steeped with this lore and symbolism, he went to New York and set to work.



How paints were applied from a chair scaffolding moved from spot to spot by an assistant standing on the floor.

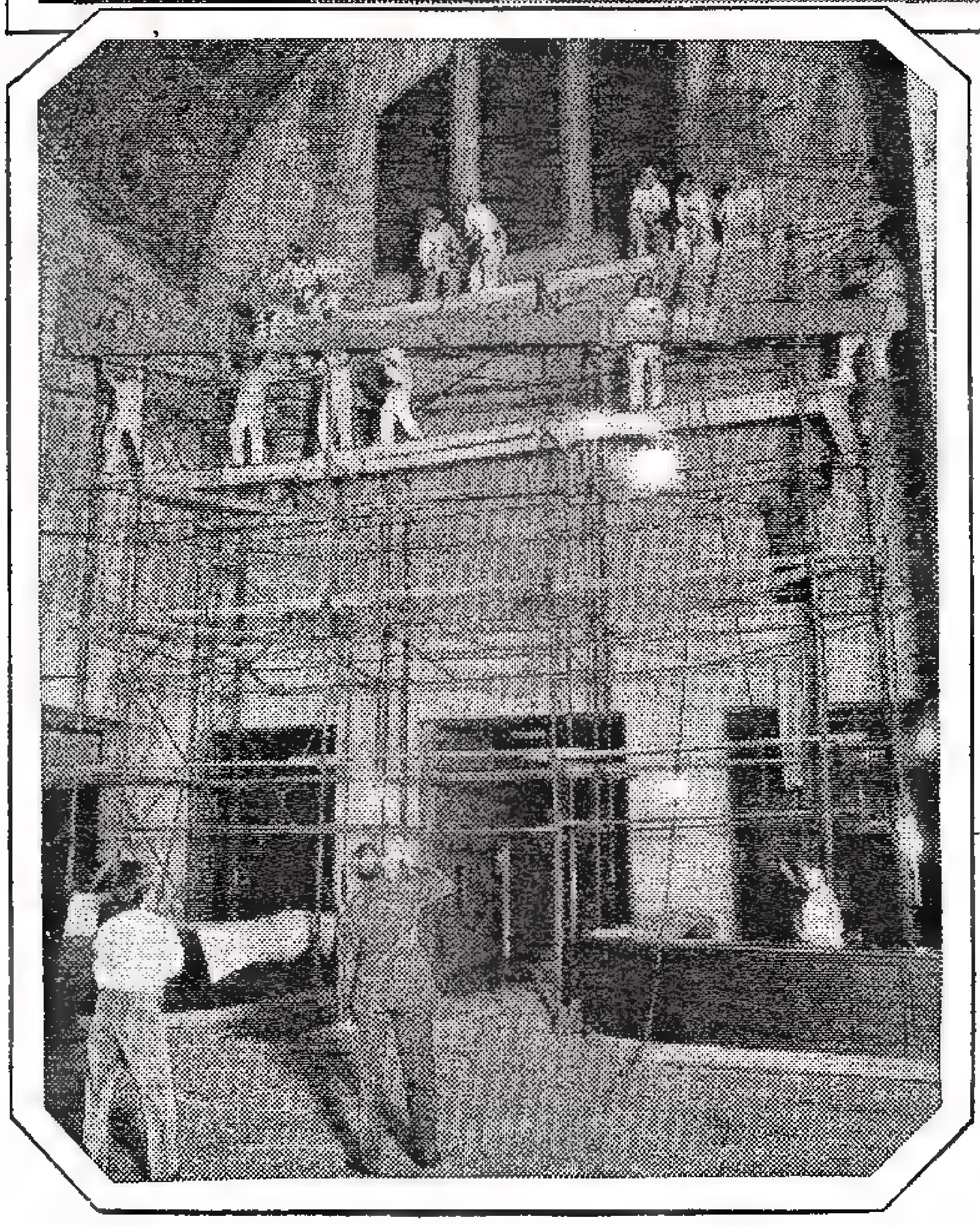


Retracing Sketches from Projected Lines | Applying Color to Canvas | Hanging Completed Murals

Photographs of the working cartoons were thrown on the canvas by a powerful projection machine and the outlines traced in exact accuracy. Three separate coats of paint were applied to protect against dust and time. Large murals weigh 3000 lbs.

Single Painting Weighs Ton and a Half; Three Coats of Paint Applied

Some idea of the proportions of the murals can be gained by comparing the background painting with the figures of the artists. At right above, a section illustrating technique.



In hanging the murals, they were hoisted in rolls by block and tackle, anchored at the top, and bound to the wall with white lead against which the canvas was flattened while the lead was still wet. Note intricate scaffolding employed.

With the size of each painting arbitrarily set by the library spaces to be adorned, the artist divided his subject matter into twelve groups. Taking each in turn, his material further was segregated into detailed "blueprints." He then plotted the five successive processes through which he hoped to develop his material to the finished work.

The first stage was that of preliminary sketching. These rough draughts were produced to ordinary drawing board size and sketched from living models. More than 1,000 of these sketches were made, another labor of many months.

Cornwell took his sketches to London. There he worked them over into ordered groupings on the larger scale of three inches to the square foot. This was the second stage outlined.

The third stage was enlargement into a "working cartoon" seven feet square. Here the drawings were completed to final form and detail. They were then photographed and reduced to camera plate inches. This idea was a complete departure from all precedent in order later to insure absolute fidelity to the true perspective of his original sketches.

The next, or fourth step, carried the project into the all-important field of color. Not only must he choose a correlated color scheme but one completely reconciled to the library background. Complete harmony was of course an elementary mandate.

Meanwhile in Belgium special looms and workmen were weaving his virgin canvasses. Tough, durable, of costliest materials, specially treated for time-resisting qualities, they were intended to be as indestructible as human ingenuity could make them. The cost, delivered in Los Angeles, before a stroke of the brush was approximately $25,000. This is probably the top figure ever paid for artist materials.

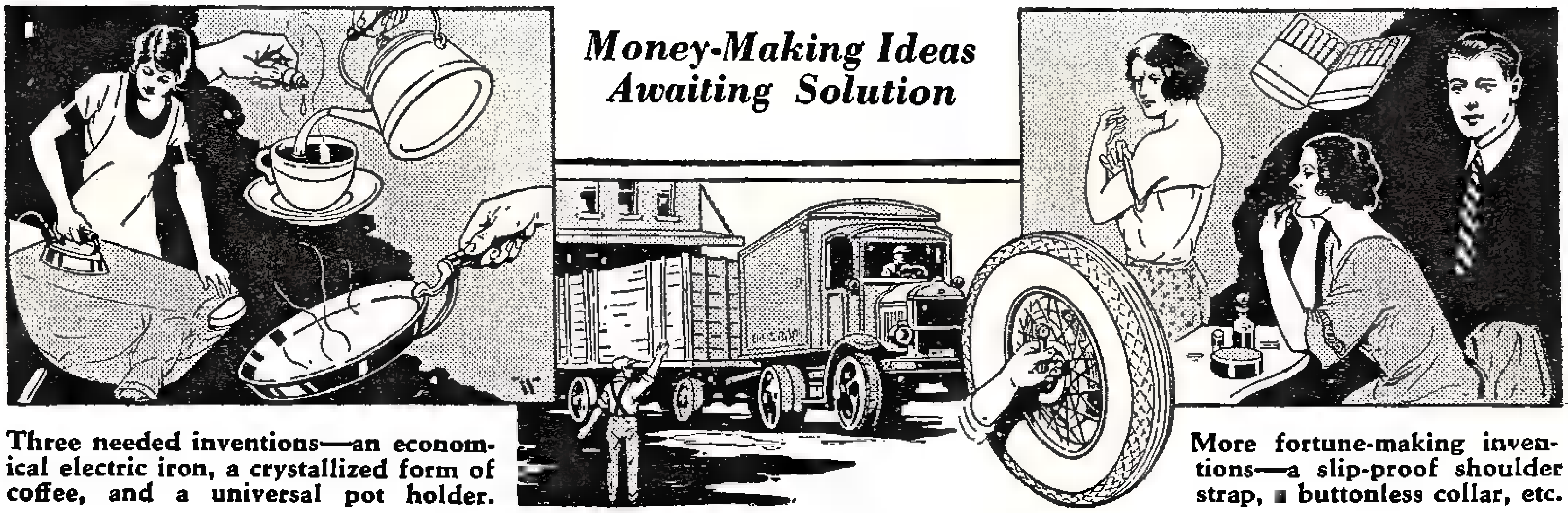
In Los Angeles the artist long sought in vain a studio both fireproof and sufficiently large for his purposes. He at length found a four-story wooden structure once used as a motion picture studio. But it was far from immune to fire and Cornwell's days and nights for more than two years were harried by the fear of flames.

After nearly two and a half years of preliminary work, however, the artist was now ready to proceed.

(Continued on page 127)

Fortunes Waiting for Inventors

Money-Making Ideas Awaiting Solution



Three needed inventions—an economical electric iron, a crystallized form of coffee, and a universal pot holder.

More fortune-making inventions—a slip-proof shoulder strap, a buttonless collar, etc.

AMERICA appears to be going invention-mad. During the last few weeks a number of letters from manufacturers and finance agencies have been received asking for new ideas.

Editor's note: Questions of readers desiring advice on how to secure patents, on methods of procedure, or on ideas for inventions, will be answered when such requests are accompanied by a stamped, self-addressed envelope. Never send models as they cannot be accepted. Address inquiries to Patent Editor, Modern Mechanix and Inventions, 529 So. 7th St., Minneapolis, Minn.

There is a great wave of stimulation going on in our business and everywhere the cry is for more inventions, more clever ideas with which to start the wheels of industry. Readers are rapidly growing more conscious of this need and they are writing in great numbers asking for larger lists of needed inventions.

For that reason this month we go into less detail in connection with each listing and in place of this detail list a larger number of items.

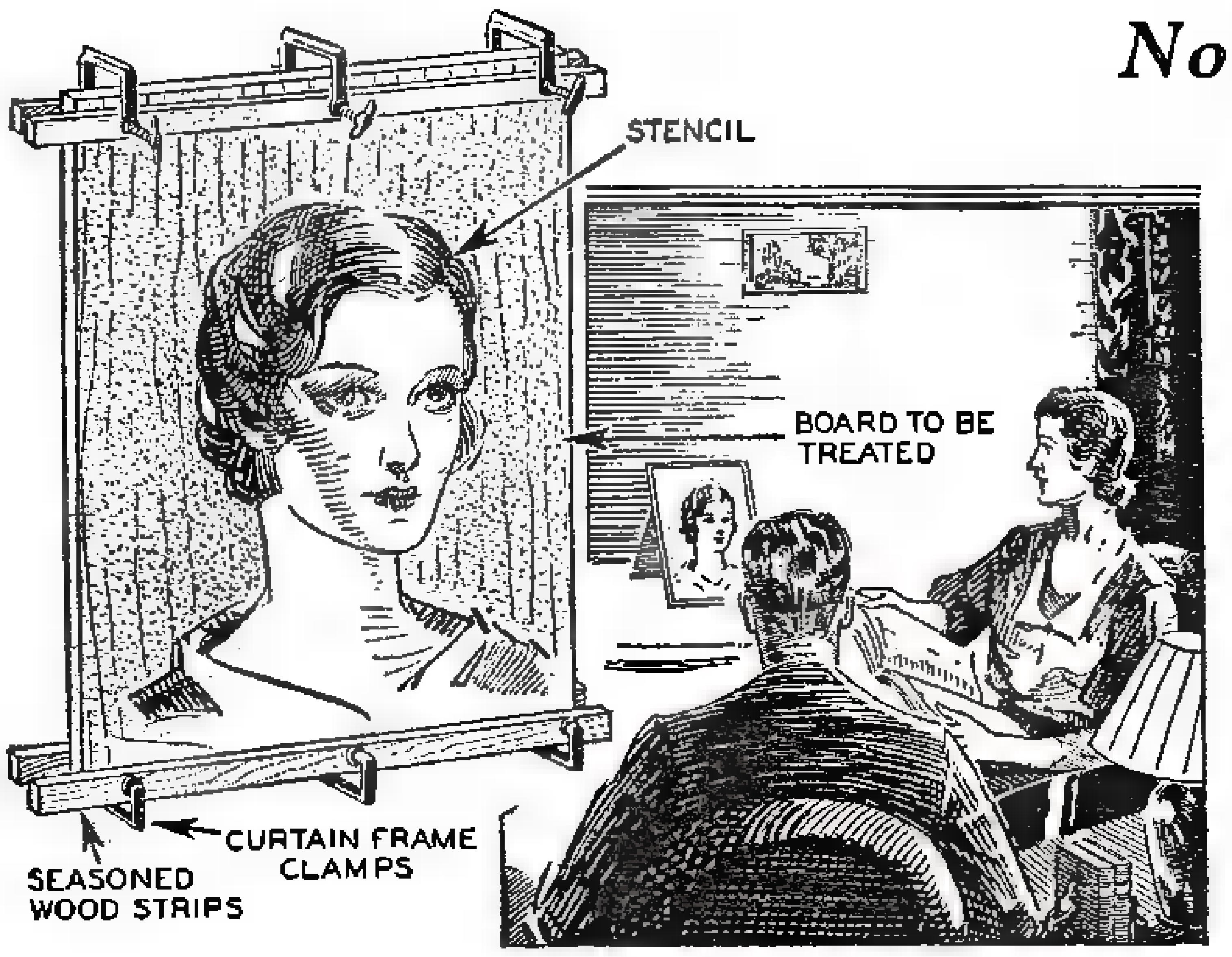
Here they are:

1. A simple little ten-cent gadget is needed with which a housewife may skim the hot grease from the top of cooking soup. It should be some sort of a syphon device and should work in a simple manner.
2. A method of supplying thermal insulation to an electric flat iron that will prevent such a large wastage of heat through the top of the iron as is now the case. If this were prevented, irons would operate with the consumption of half the current they now use.
3. A simple anti-draft attachment that can be placed on the front door windows of old cars. Something that could sell for about two dollars would make a big clean-up due to the heavy advertising of this feature by General Motors.
4. A pressure gauge for automobile tires in combination with the valve. In other words, a gauge that will be sold with each tire and will permit the car driver to note the tire pressure at all times.
5. Some kind of a simple little alarm for gasoline tanks that will warn the driver when the gas is very low. The present gauges last for a short time and then fail to work properly.
6. An improved method of steering a four-wheeled trailer when the driver of the power truck is backing up. Some sort of control over the front wheels of the trailer is needed.
7. A captive golf ball for practice work that when struck will tell the would-be player how long the drive would have been in yards.
8. An ammunition feed belt for machine guns that will be made of paper and cheap enough to throw away when emptied.
9. A simple goggle that will be more perfectly ventilated and prevent perspiration about the eyes when they are worn for long periods.
10. A means by which essence of tea or coffee can be crystallized and the respective beverages made by the simple application of hot water. Here is a quick fortune.
11. A universal handle for pots and kettles is needed. By this is meant a detachable handle that can instantly be applied to pie tins, cake tins and other kitchen ware when it is hot. It should sell for twenty-five cents and will bring a big fortune to the lucky inventor.
12. A simple electric chandelier for the dining room that may be raised or lowered over the table without the use of counterweights.
13. There is needed some sort of a simple device that can be attached to the front of a baby carriage so that it will mount curb stones more easily.
14. A change making machine to be installed near telephone booths so that when a dime or quarter is inserted the proper number of nickels will be returned.
15. A means of determining the amount of grease in the rear end or differential housing of a motor car without the necessity of removing the plug.
16. A window puttying machine that will feed the putty in a triangular strip, thereby speeding up the operation.
17. Some sort of a simple little me-

(Continued on page 136)

HANDIKINKS

Aids that will help you in mechanical work about the house, in the garage, in the shop, basement work nook, or any place where new short cuts will save time and trouble, are included in these handikinks.

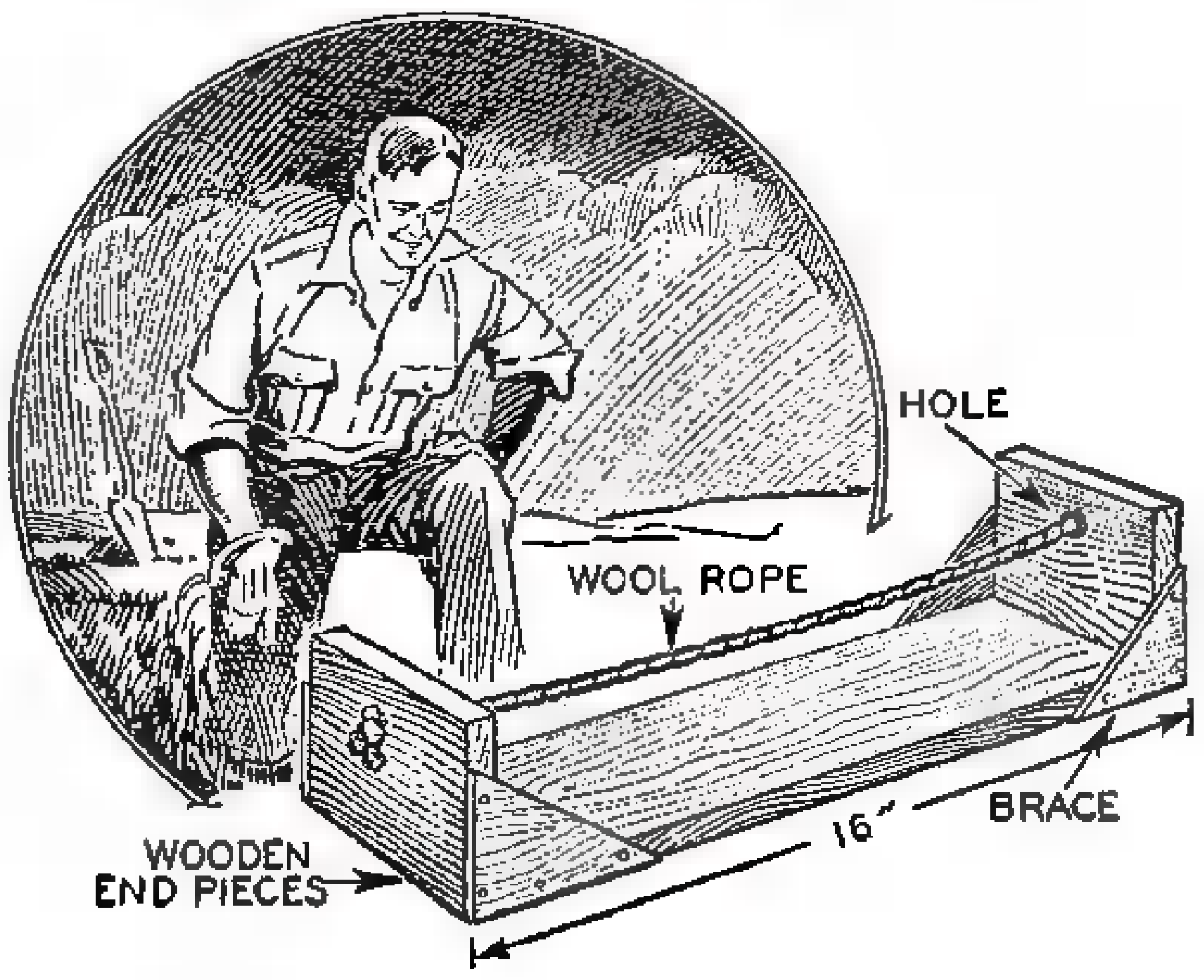

STENCIL
BOARD TO BE TREATED
CURTAIN FRAME CLAMPS
SEASONED WOOD STRIPS

Novel Sunlight Photography on Wood

A PERSON handy in working with wood can make a great many beautiful articles such as trays, panels of furniture, etc., by taking advantage of the propensity of the sun's rays for turning woods, such as the 5 year fir and the cimbra pine, a rich brown after a couple of weeks' exposure to its rays. A pierced stencil of tin or heavy black paper bearing the stenciled design is pasted to a freshly planed piece of wood. This is clamped down to prevent warping. A two weeks' exposure to the sun will turn the exposed portions a rich brown. The design may be fixed by applying clear varnish.—Robt. W. Gordon.

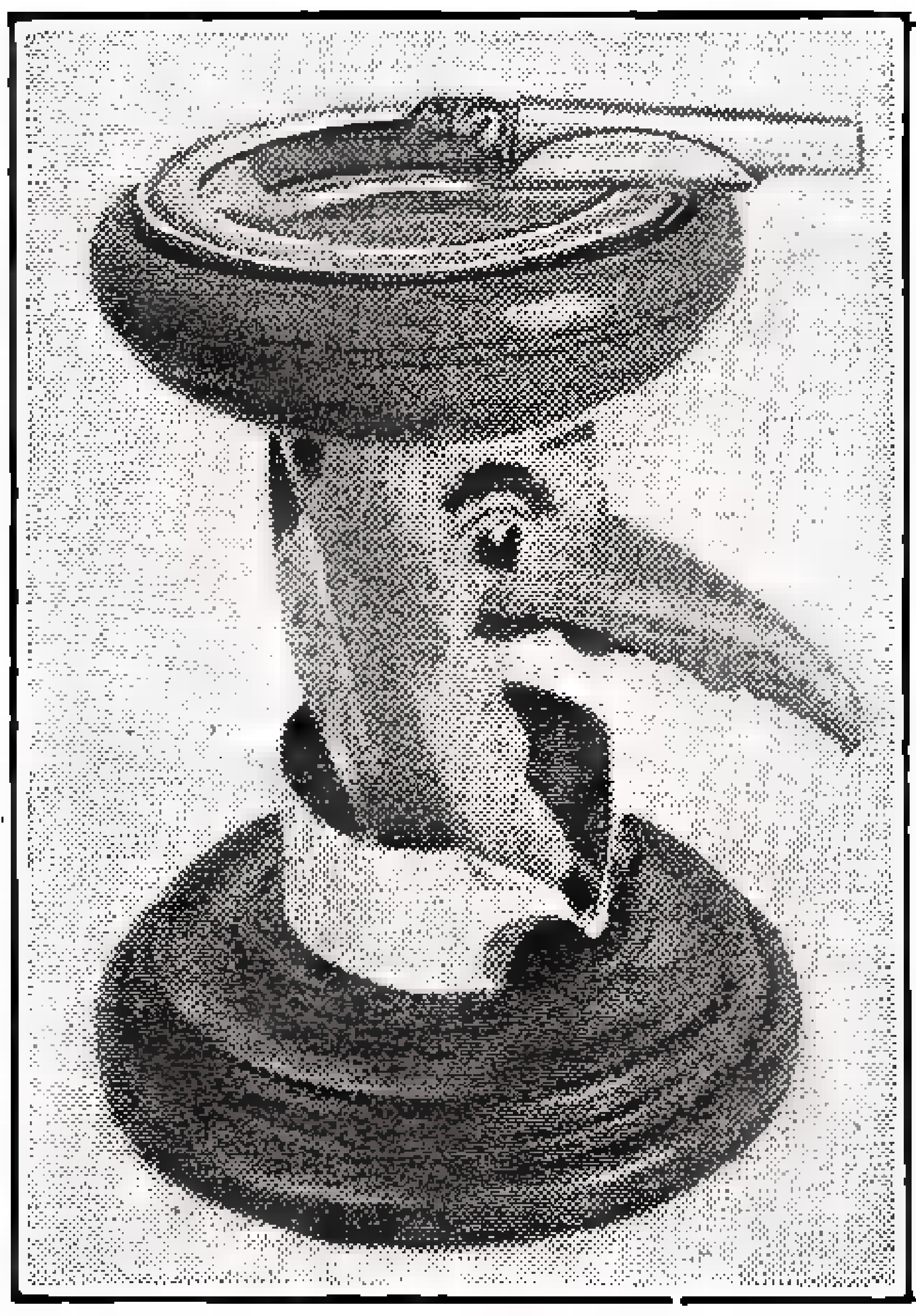
Interesting Barometer Made From Scraps

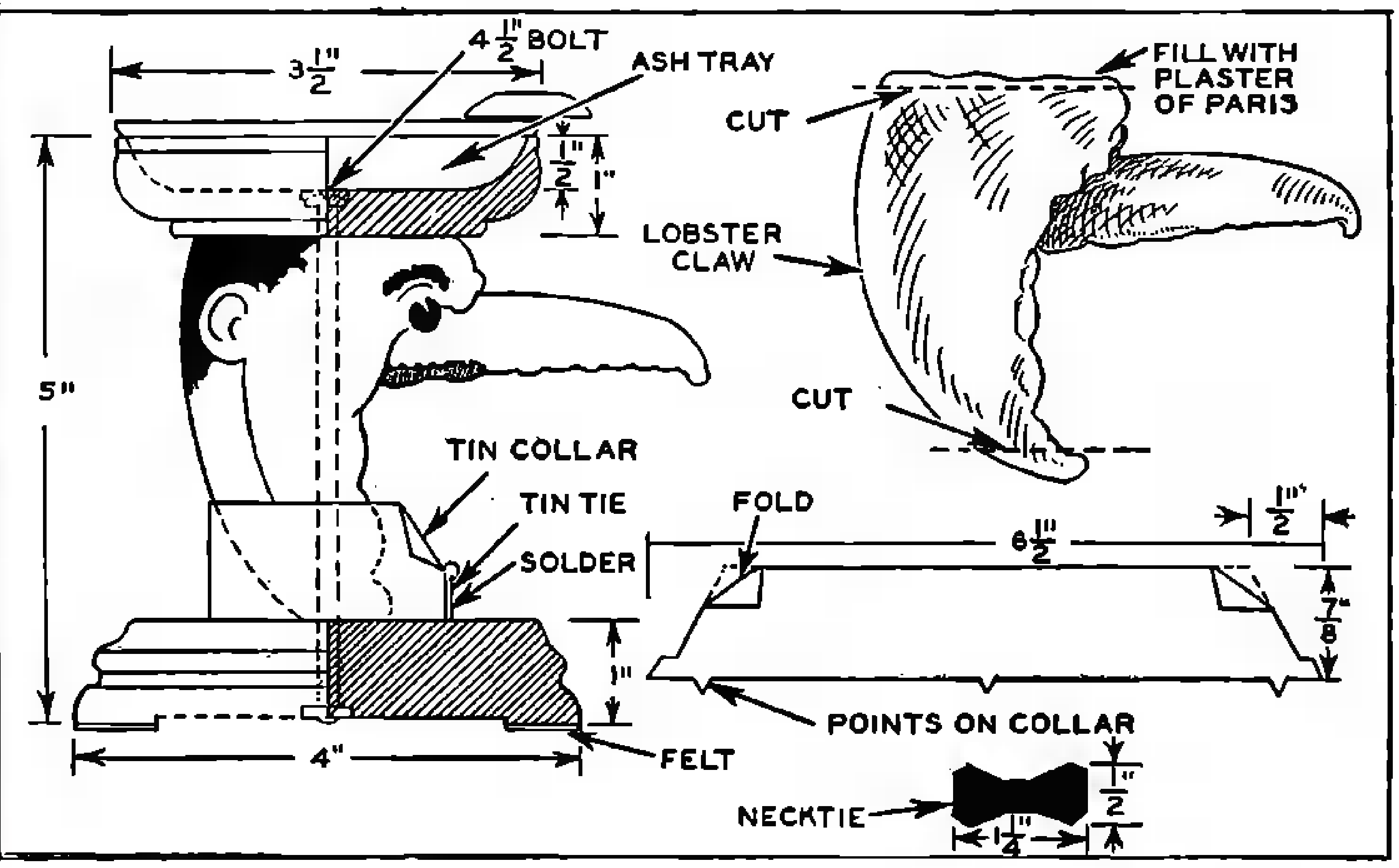
AN ACCURATE forecaster of rain may be made at no cost at all from scraps available around any house. Make a rigid frame consisting of a board with two end pieces, which should be braced to prevent them from pulling inward. Bore a hole through each end piece and insert a length of wool cord, rope, tow, or any cordage. Wool rope such as is used for bathrobe strings is best. The cord should be thoroughly wet and drawn tight through the holes, and knotted at the ends. When the cord dries it will sag. When air becomes moist as before a storm the rope will tighten.—Walter Brixius.


HOLE
WOOL ROPE
BRACE
16"
WOODEN END PIECES

This "Bim Gump" Ash Tray Is Easy to Make From Common Materials

ON a disc of wood 4" diameter by 1" thick, a tin collar is mounted and painted white. A lobster claw, one preferably about 5" long and a nice pink color, is cut at the joint so it can be opened, the finger forming Bim's nose. This is then poured full of plaster of Paris and mounted on the disc. A 4½" bolt is used to hold the turned tray down to the head and base disc. The base is finished by gluing felt on it. Bim's countenance is painted on the upright or fat part of the claw.—O. E. Olson.

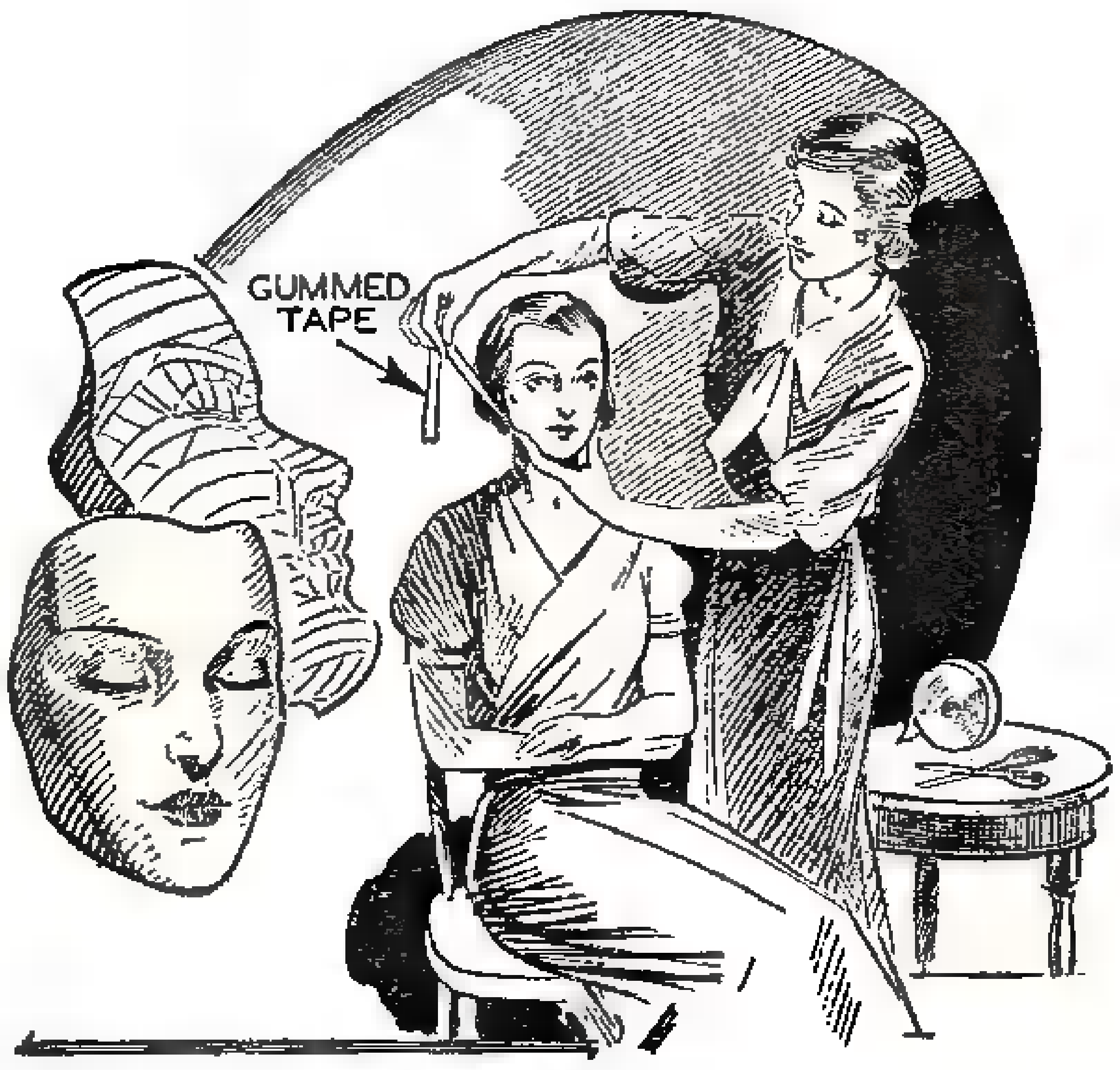



4½" BOLT
ASH TRAY
3½"
½"
1"
5"
TIN COLLAR
TIN TIE
SOLDER
1"
4"
FELT
FILL WITH PLASTER OF PARIS
CUT
LOBSTER CLAW
CUT
FOLD
6½"
½"
7/8"
POINTS ON COLLAR
NECKTIE
½"
1¼"

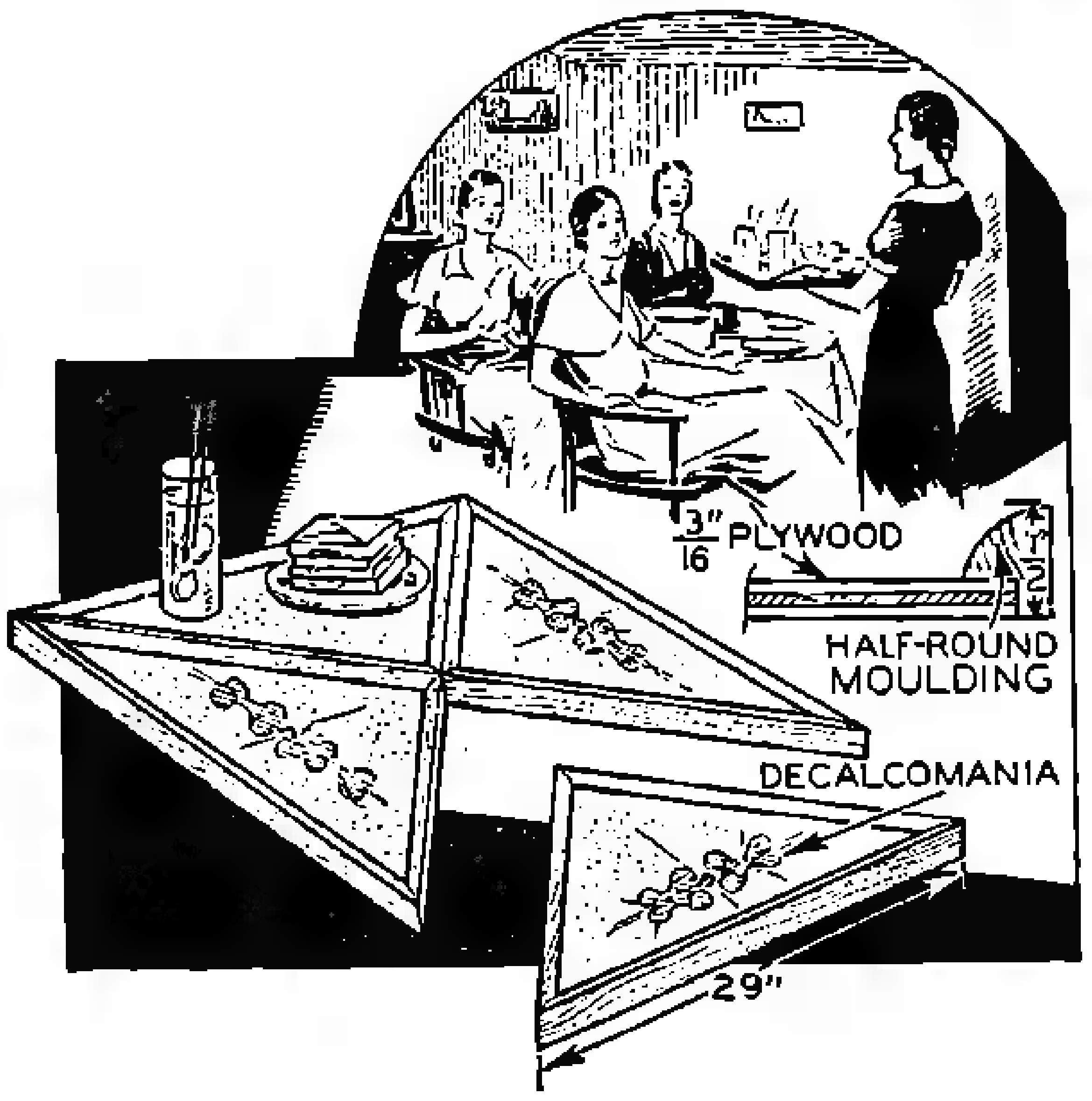
Simple Ideas of General Interest

Making Artistic Portrait Masks Is Great Fun

IF YOU'RE in the least artistically inclined you'll find heaps of keen fun making portrait masks of your friends. The stunt is simplicity itself, and makes use of only three materials—a basin of water, a little cold cream and a roll of gummed paper tape like druggists use in sealing packages. First coat the victim's face with cold cream, then dip the paper tape in water and apply to the skin as illustrated. The moisture makes the tape perfectly pliable. When the first layer is put down, the second layer of paper is added, the mask constantly being moulded to the shape of the face. When completed, the mask is removed gently and allowed to dry, after which it will hold its shape permanently. Finish the mask by painting in lips, eyebrows, warts, etc.—R. A. Neiss.



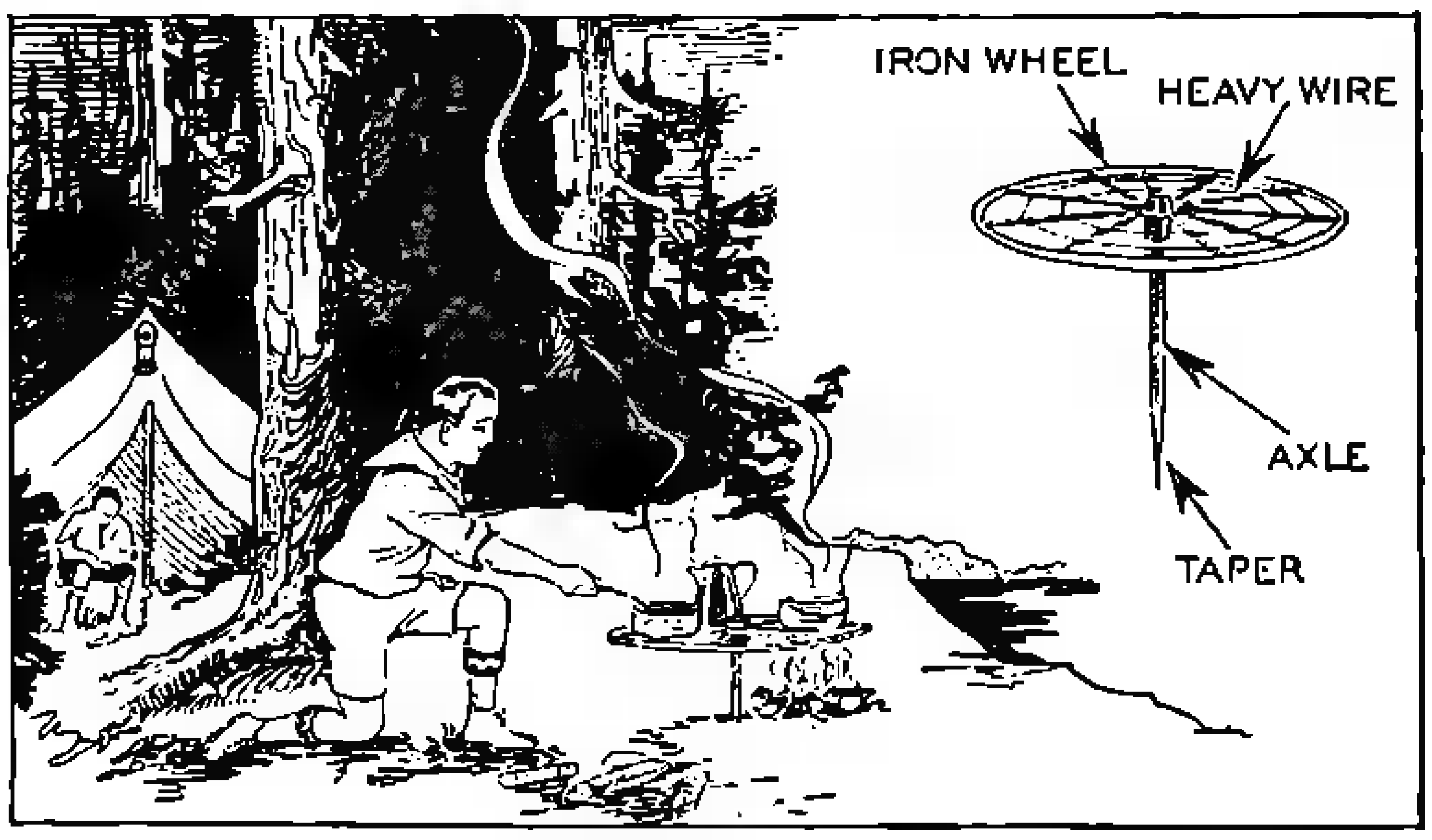
Novel Serving Trays for Bridge Guests



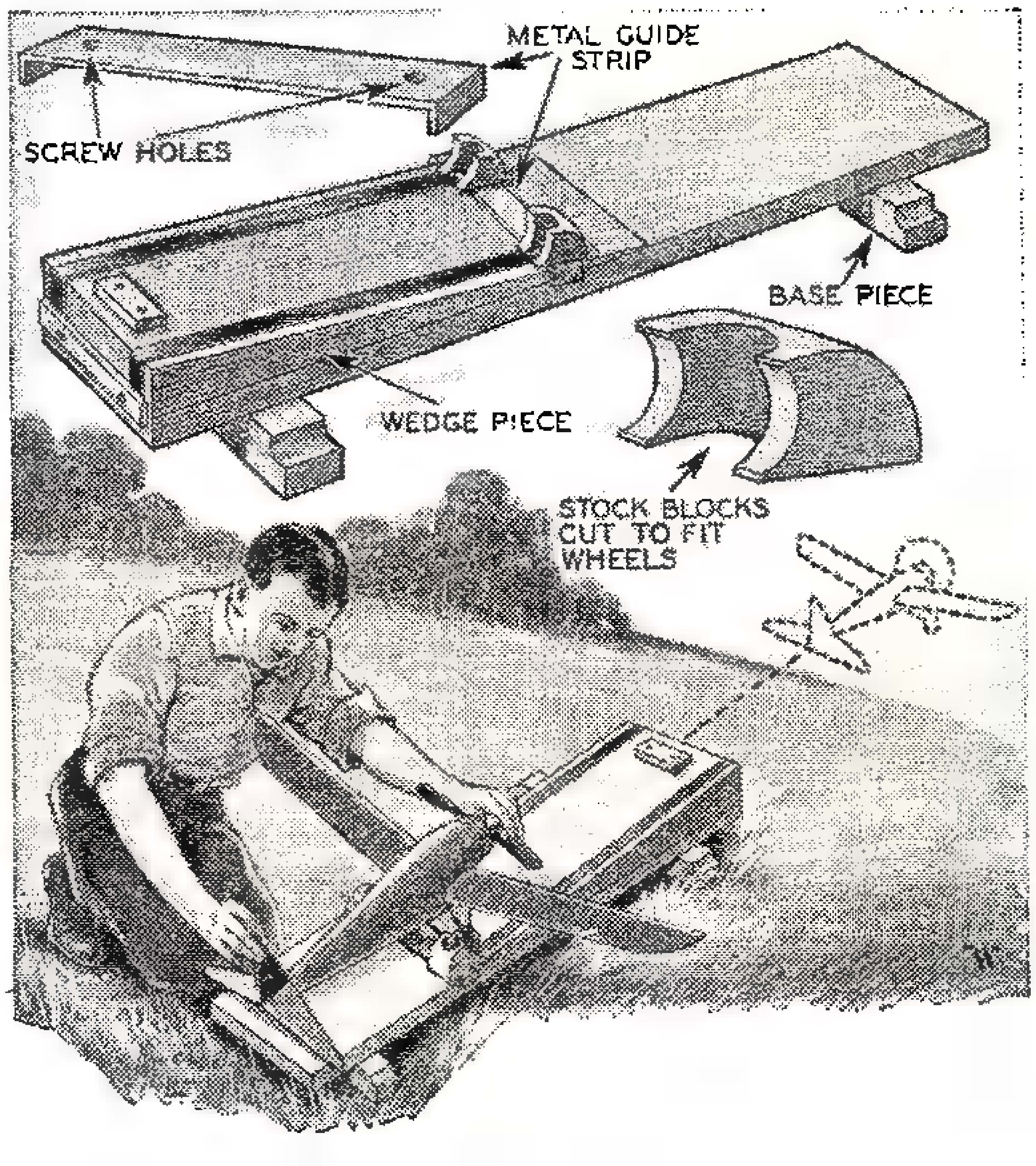
FOUR attractive serving trays in triangular shape, which form a compact square when placed together, can be made easily with plywood and moulding. Cut a 29-in. square of 3/16-in. plywood, and then quarter it by diagonal cuts. Smooth the edges and fit half-round moulding, rabbeted as shown in the sectional drawing, around the edges. Corners are mitered and the pieces then glued to the plywood. The trays should be thoroughly sandpapered and finished to suit individual taste. A black lacquer, following a wood filler, and several coats of shellac properly smoothed with steel wool makes a striking finish. A decalcomania design in each tray adds an effective note.—Earl Boynton.

Iron Wheel Makes Camp Stove

THE drawing at the right shows you how you can make a simple camp-stove from a discarded iron wheel and axle. Heavy wires are threaded between the spokes to form a grill work on which to set cooking utensils. Hub is driven into ground.—James Mason.

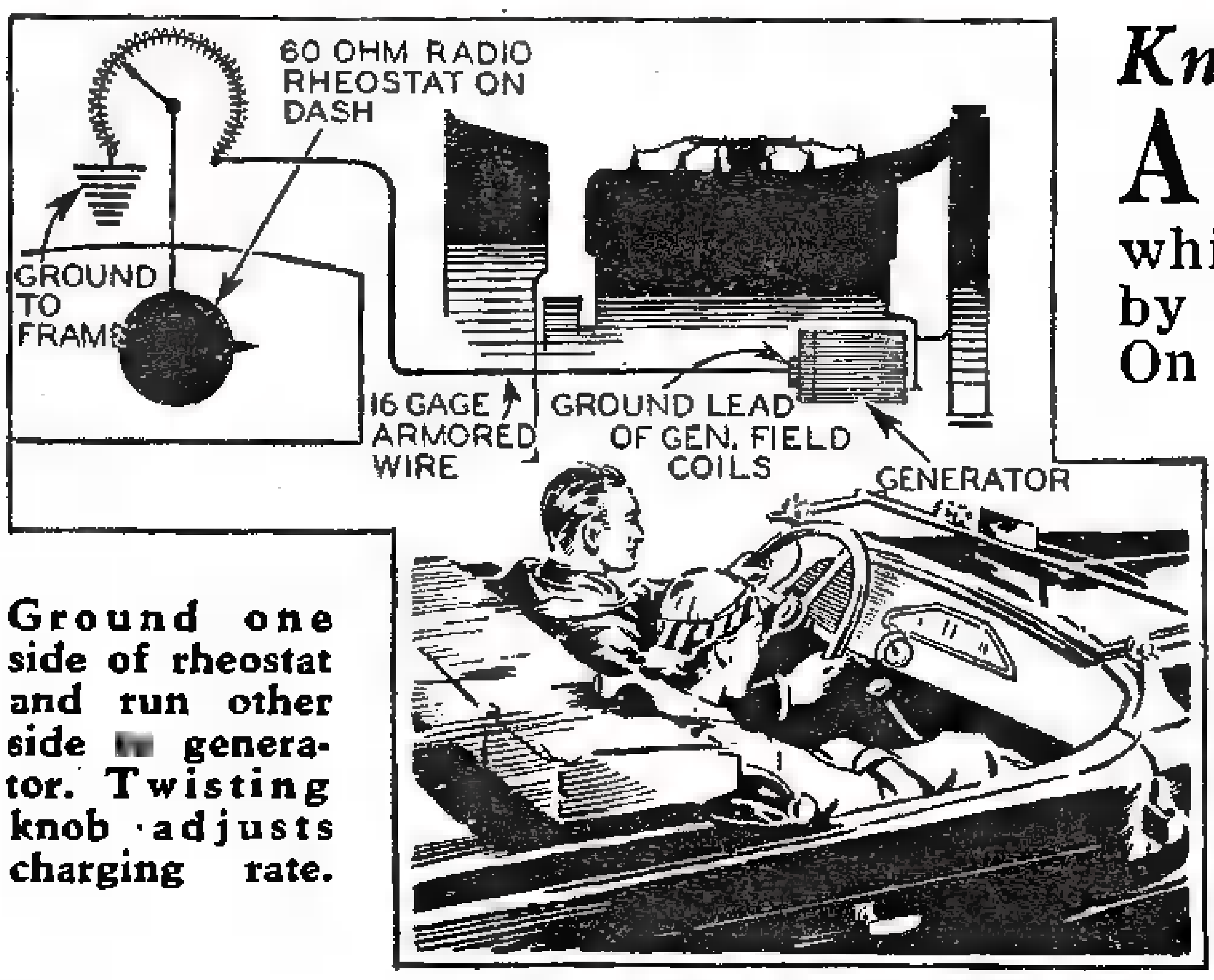


Catapult to Launch Model Planes



JUST as do powerful hydraulic catapults launch hydroplanes from ships at sea so will this little catapult launch your model plane. The baseboard of the catapult should be about an inch wider than the wheels of your plane, and about three feet long. From another board of the same width, saw a wedge, then nail the two pieces together as shown in the drawing. Cut the stop blocks from soft pine to the shape of the wheels of your plane and attach them to a guide strip made of heavy galvanized iron. Finally attach the rubber bands, and nail on the stopping piece. To launch a plane, place the wheels in the blocks, and wind up the propeller. At the right moment release the tail and propeller and let 'er fly into the air.—Dale Van Horn.

Kinks Boost Motor Efficiency


60 OHM RADIO RHEOSTAT ON DASH
GROUND TO FRAME
16 GAGE ARMORED WIRE
GROUND LEAD OF GEN. FIELD COILS
GENERATOR

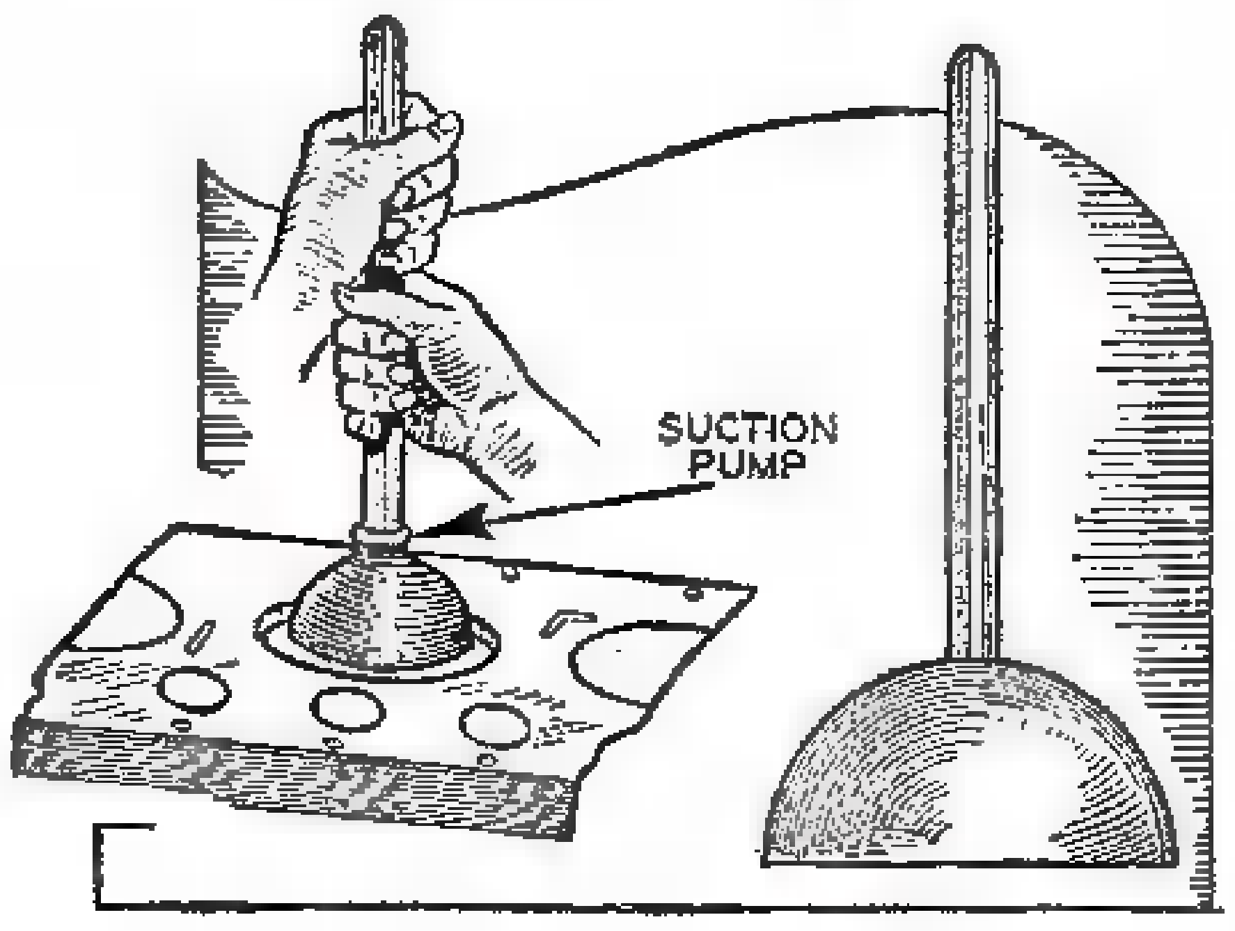
Ground one side of rheostat and run other side to generator. Twisting knob adjusts charging rate.

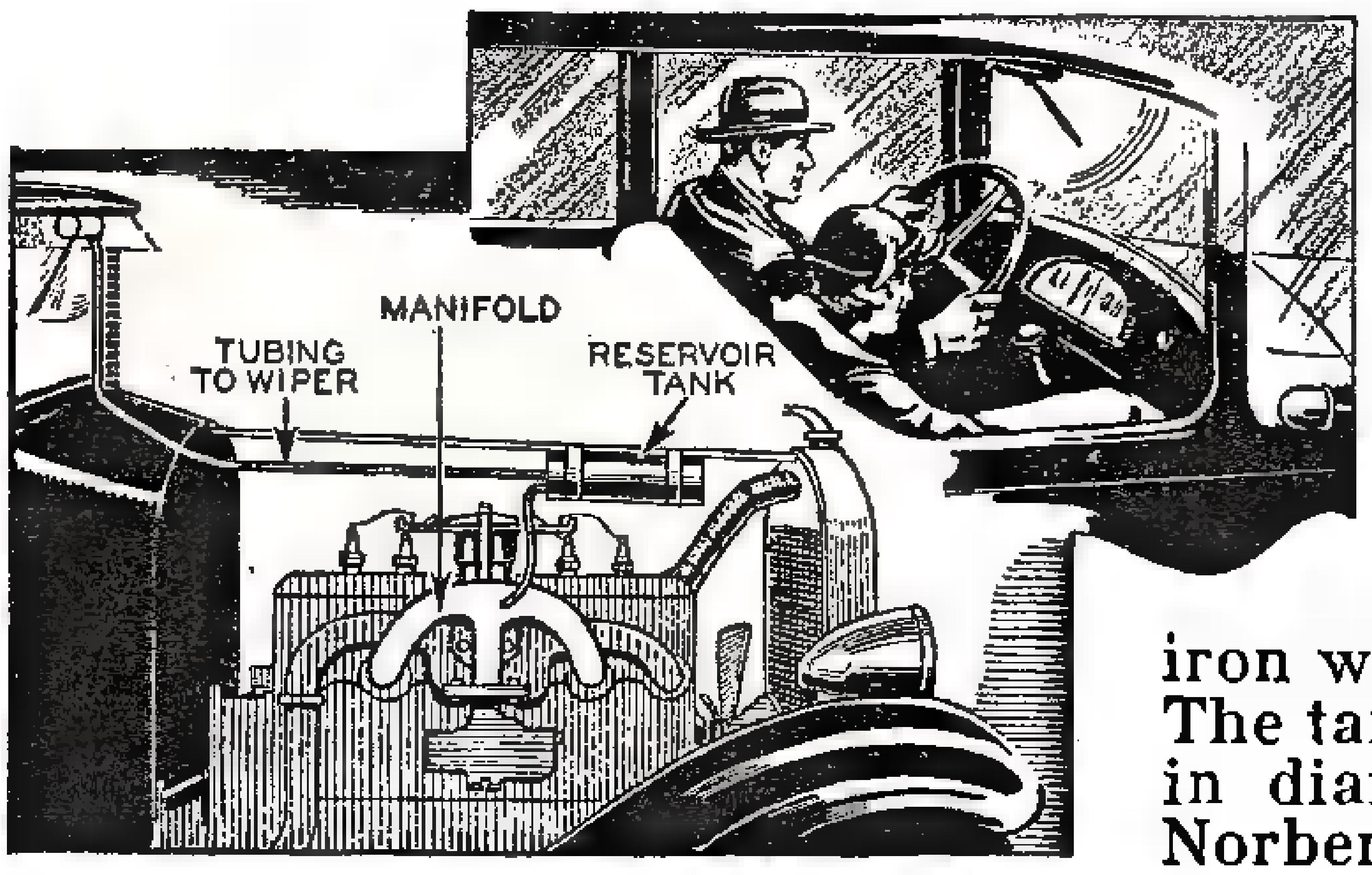
Knob on Dash Adjusts Charging Rate

A CAR battery has to stand some heavy punishment, but not if you utilize this little kink, which permits you to adjust the charging rate by the twist of a knob on the dash of your car. On the dash secure a substantial radio rheostat and from its terminals run two leads of armored wire, one to the ground and the other to the generator lead that grounds the field coils. This hook-up puts the rheostat in series with the ground lead, and permits you to adjust the charging current. Incidentally set third brush on generator to maximum charging and lock it there. When rheostat is at minimum your battery gets maximum charge and vice-versa.—C. Meier.

Suction Pump Tests for Loose Bearings, Wrist Pins

THE next time you have your engine head off try this stunt to test for loose bearings. A suction pump of the type used by plumbers is worked up and down in the cylinder. If the piston can be moved up or down the least bit by this stunt, you may rest assured that either the bearing or the wrist pin is loose. How the pump is handled is shown at the right. —Avery E. Sewell.


SUCTION PUMP

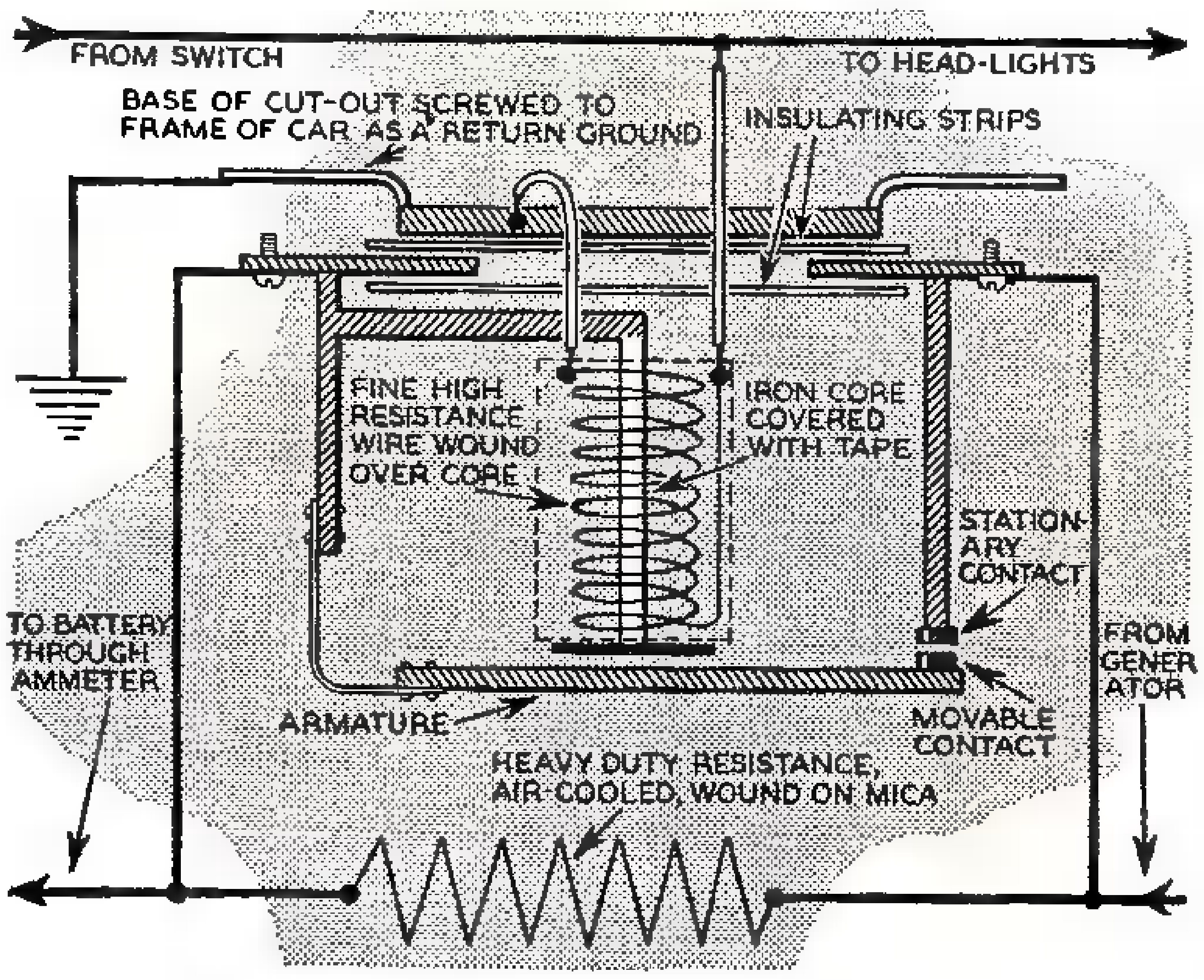

MANIFOLD
TUBING TO WIPER
RESERVOIR TANK

Keep Wiper Going When Car Stops

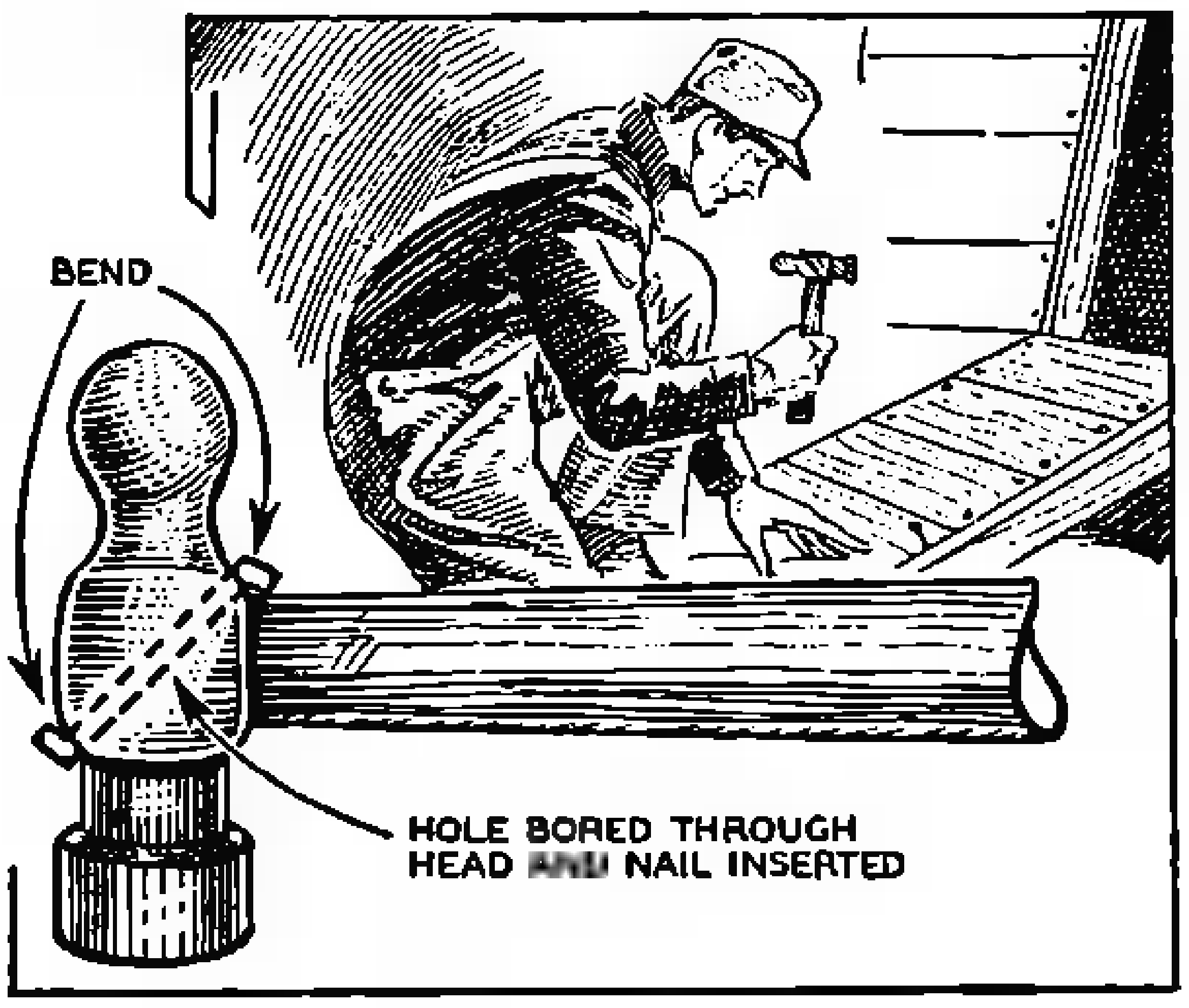
A RESERVOIR tank inserted in the windshield wiper line from the engine manifold will keep the wiper operating when you stop your car. The tank, which can be made from sheet metal, should be installed as illustrated in the drawing. Air pressure built up in the tank while the car is running, keeps the wiper operating when the motor has slowed down. Pipe strapping or strips of sheet iron will secure the tank to the rod above the motor. The tank for best results should be about two inches in diameter and about eight inches long.—George Norberg.

Rebuilt Cut-out Prevents Ruination of Battery Due to Over-charging

MORE auto generators are ruined by overcharging than in any other way, so it behooves you to build this little protector from an old generator cut-out. The heavy wire winding over the cord of the cut-out is discarded, and the fine wire is wound carefully on a spool. Next the core is covered with friction tape and the wire is wound back in place, the two ends being threaded through the hole in the base. Then the relay is assembled again. One end of the fine wire winding is soldered to the frame base of the cut-out, while the other end is soldered to a piece of lamp cord that runs to one of the headlight wires. Then bolt the relay to the frame of the car, forming a return circuit-ground. Finally wire in the resistance (6 to 10 amperes, depending on charging rate) as shown in the circuit. With the connections all made and the headlights of the car turned on, the generator is set for the high charging rate desired. In this circuit there is always the same amount of charge to the battery, regardless of whether you are driving fast or slow or whether the lights are on or not.—Emil J. Novak.


FROM SWITCH
TO HEAD-LIGHTS
BASE OF CUT-OUT SCREWED TO FRAME OF CAR AS A RETURN GROUND
INSULATING STRIPS
FINE HIGH RESISTANCE WIRE WOUND OVER CORE
IRON CORE COVERED WITH TAPE
STATIONARY CONTACT
TO BATTERY THROUGH AMMETER
FROM GENERATOR
ARMATURE
MOVABLE CONTACT
HEAVY DUTY RESISTANCE, AIR-COOLED, WOUND ON MICA

Labor-savers for the Workshop

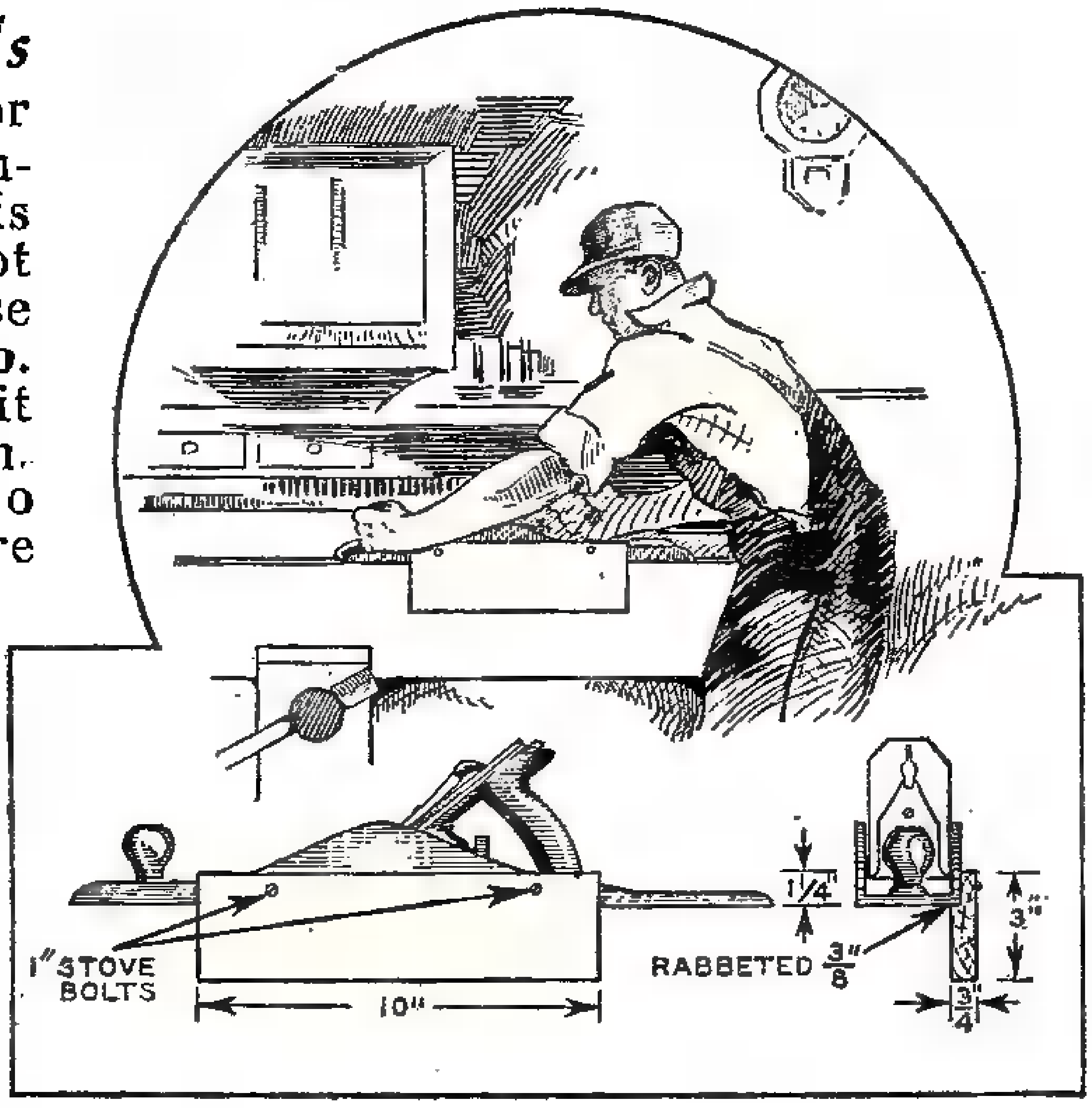

BEND
HOLE BORED THROUGH HEAD AND NAIL INSERTED

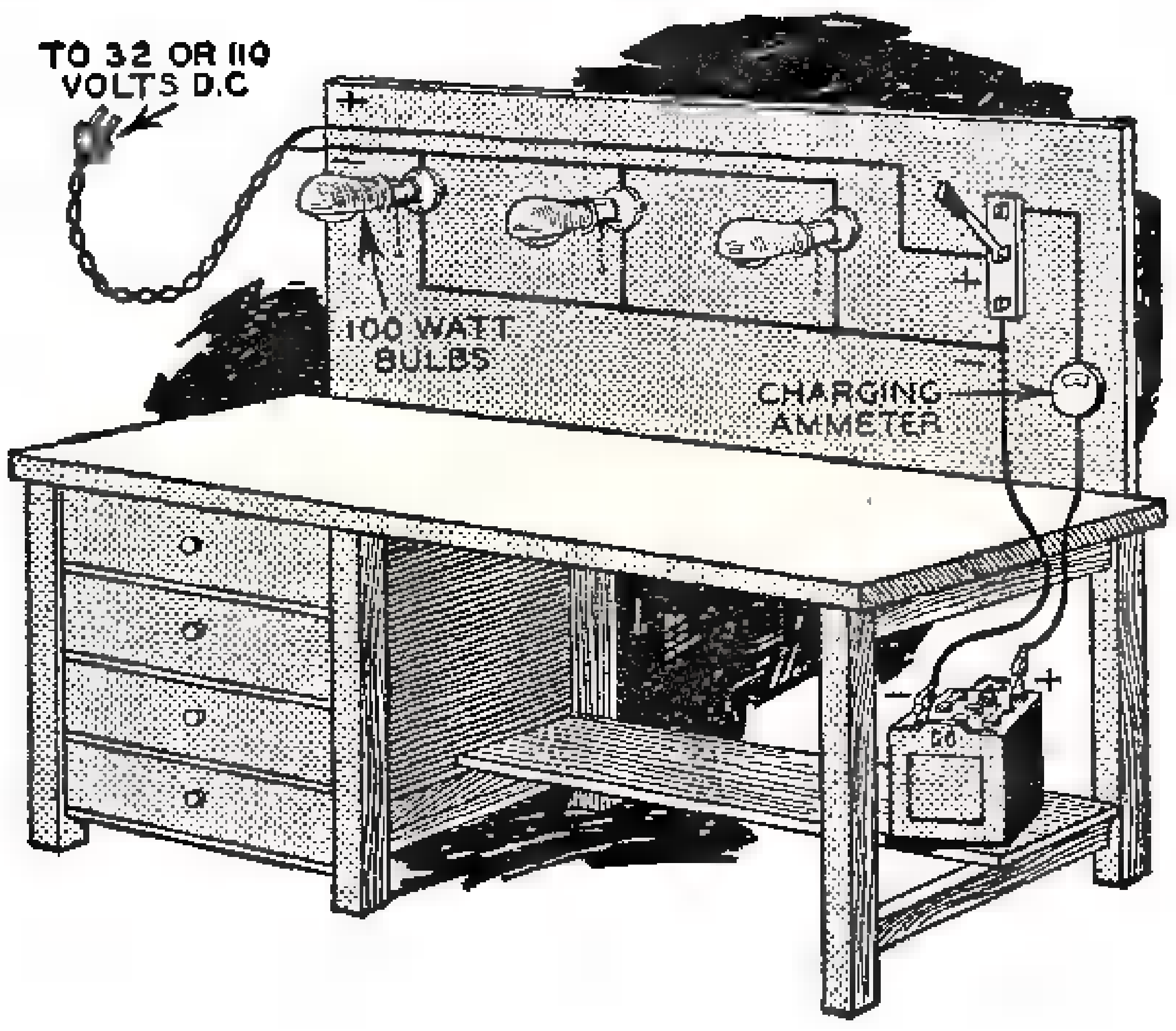
Pin Keeps Hammer Handle Tight on Head

HAMMER handles, when they grow old, have a way of flying off and thus constituting a menace to life and property. Here's a simple way to keep them on and keep them thataway for a long time. first drill an ⅛-in. hole diagonally through the end of the handle as illustrated in the accompanying drawing, then drive an ⅛-in. rod through the hole and bend over as shown. This little rod keeps the head firmly seated on the head of the hammer where it belongs. The stunt will work with any kind of hammer or hatchet. Another method is to drive a small metal wedge into the wood at the head of the handle. —Edward Sievers.

Plane Gauge for Squaring Up Boards

EVERY shopman feels the need at times for a plane gauge to square up work when joining or dressing window frames, doors, etc. This need is greatest where power planes are not available. However, don't despair, because here's a kink that will take care of the job. Simply take a piece of hardwood and dress it down to dimensions 3 in. x 10 in. by ¾ in. Then rabbet out a section 1¼ in. by ⅜ in. so that the plane bed will fit in the offset to insure a full edge cut. Next drill two ⅛-in. holes through the side of the plane as illustrated in the accompanying diagram, then bore two ⅛-in. holes through the wood gauge block to correspond to the holes in the plane. Bolt the wood to the plane and assembly is completed. When you bear down on a surface you will have a guide that will give you a square cut. When the plane is to be used for large surfaces simply remove the guide bolts.—O. E. Olson.



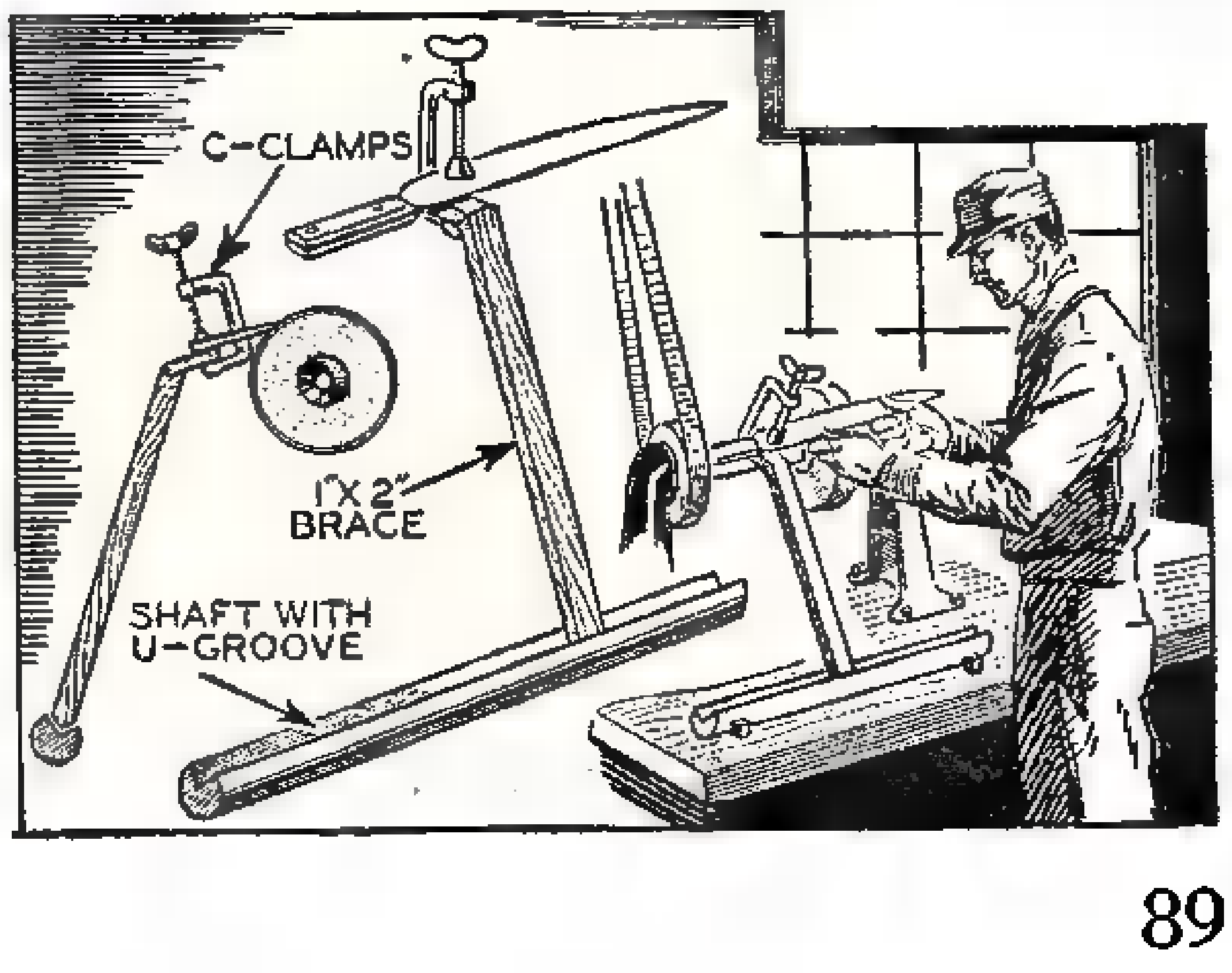


D. C. Battery Charging, Light System in One

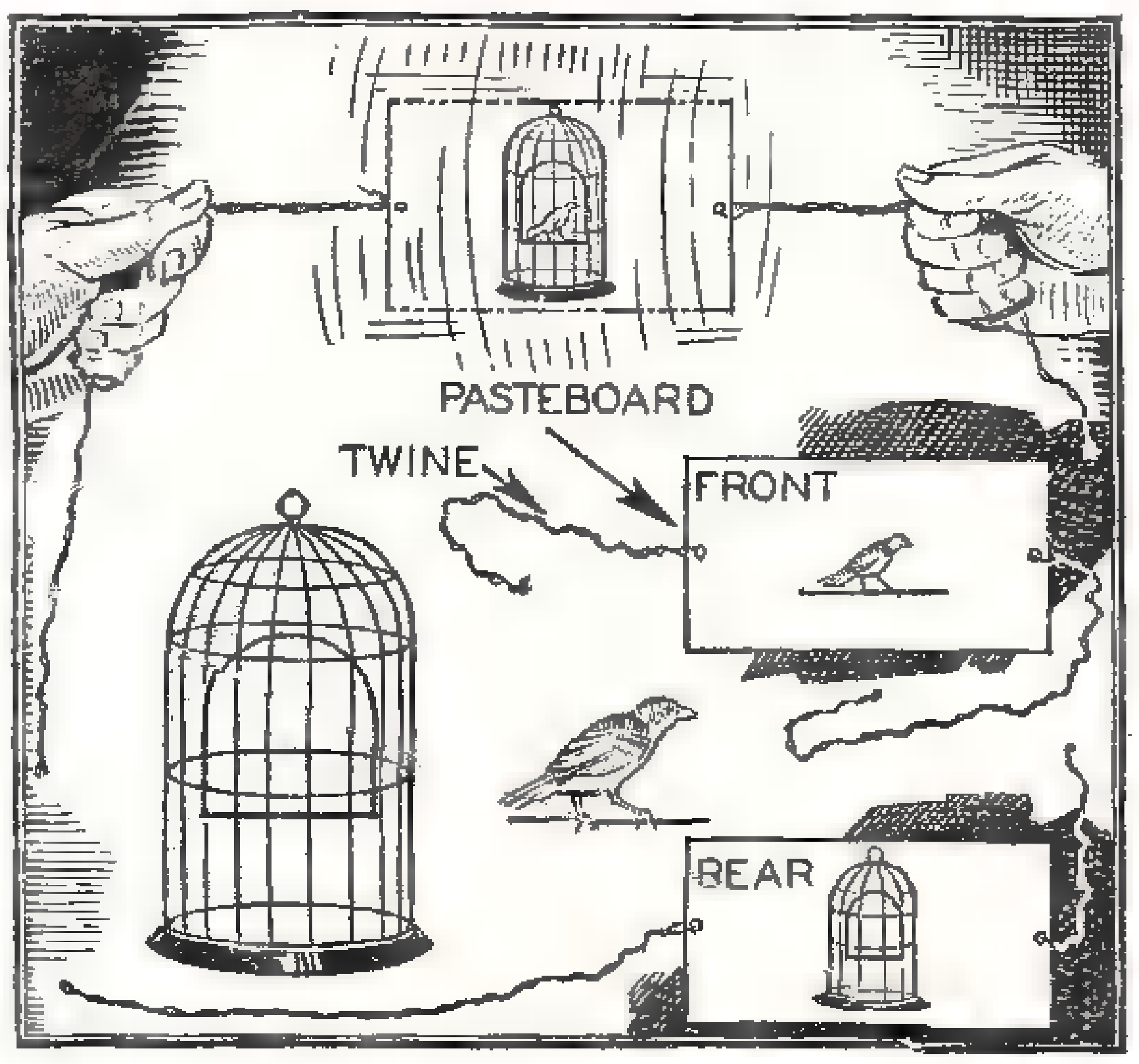
HERE is a method for charging your storage battery on a D.C. line whereby you can have illumination at the same time. Use the circuit shown at the left. Throwing the single-pole, double-throw switch to the bottom position will cut in the lights only, while throwing the switch up to top position cuts in lights and battery. The bulbs will be a little dimmer when charging, but there will be plenty of illumination if 100-watt lamps are used. Positive pole of the line must be hooked to positive pole of the battery. The bulbs can be located at any point where you need illumination—on the ceiling, roof, etc.—just as you wish.—Johnathan Askew.

Device for Sharpening Long Blades Puts Keen, Even Edge on Cutlery

A LENGTH of cold rolled shafting slotted with a V-groove, makes a fine guide for sharpening long shears, knife blades, etc., which must have an even bevel to provide a satisfactory cutting edge. As illustrated in an accompanying drawing, the knife is held in place by C-clamps secured to a small wooden platform. A 1x2 in. stick, with one end placed in the V-groove of the shaft, braces the blade for the cutting job. Round the edge of the stick and grease the groove and you will find that you can get a keen edge on your cutlery.—Weston Farmer.

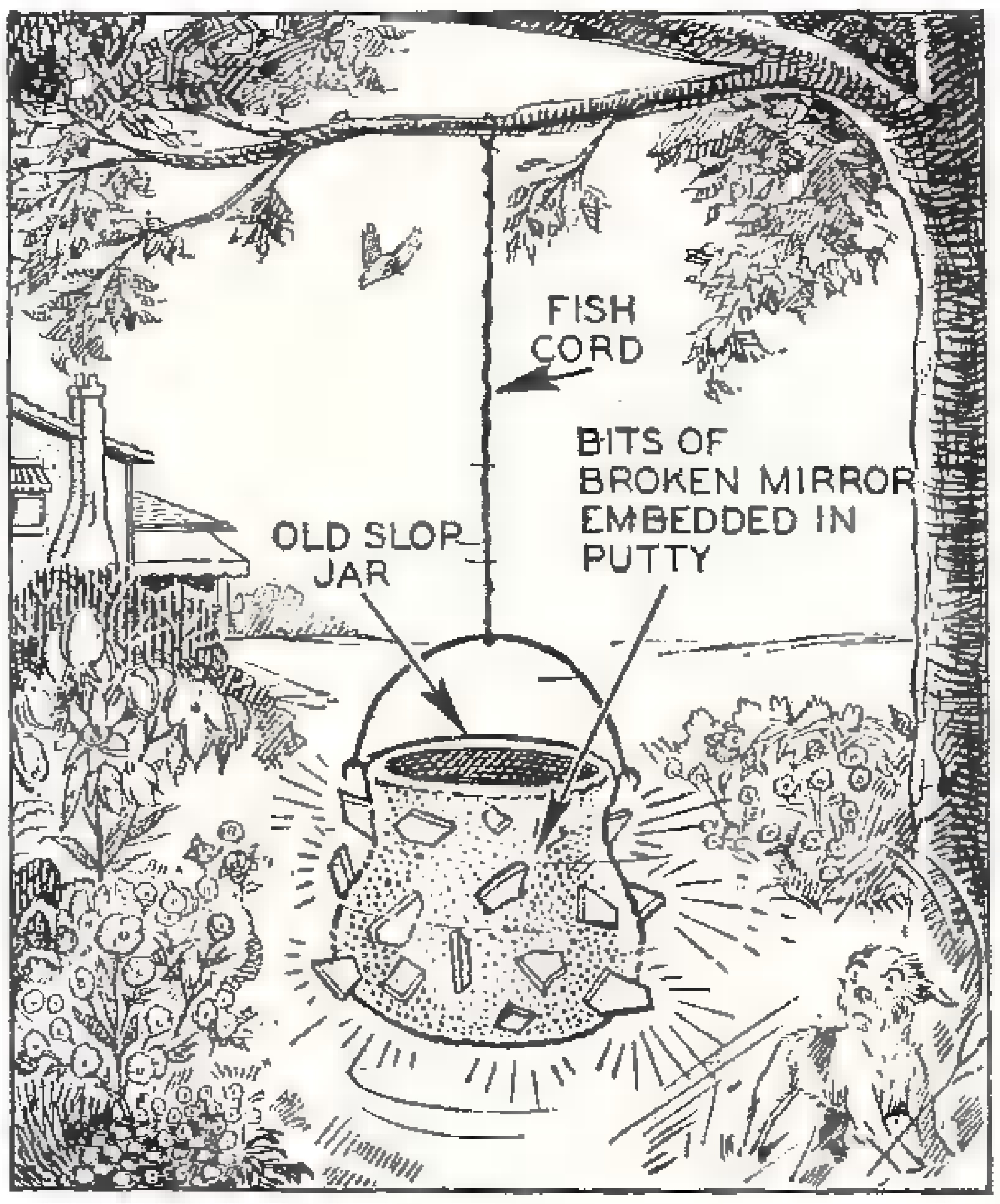


Trick Stunts Amuse and Help



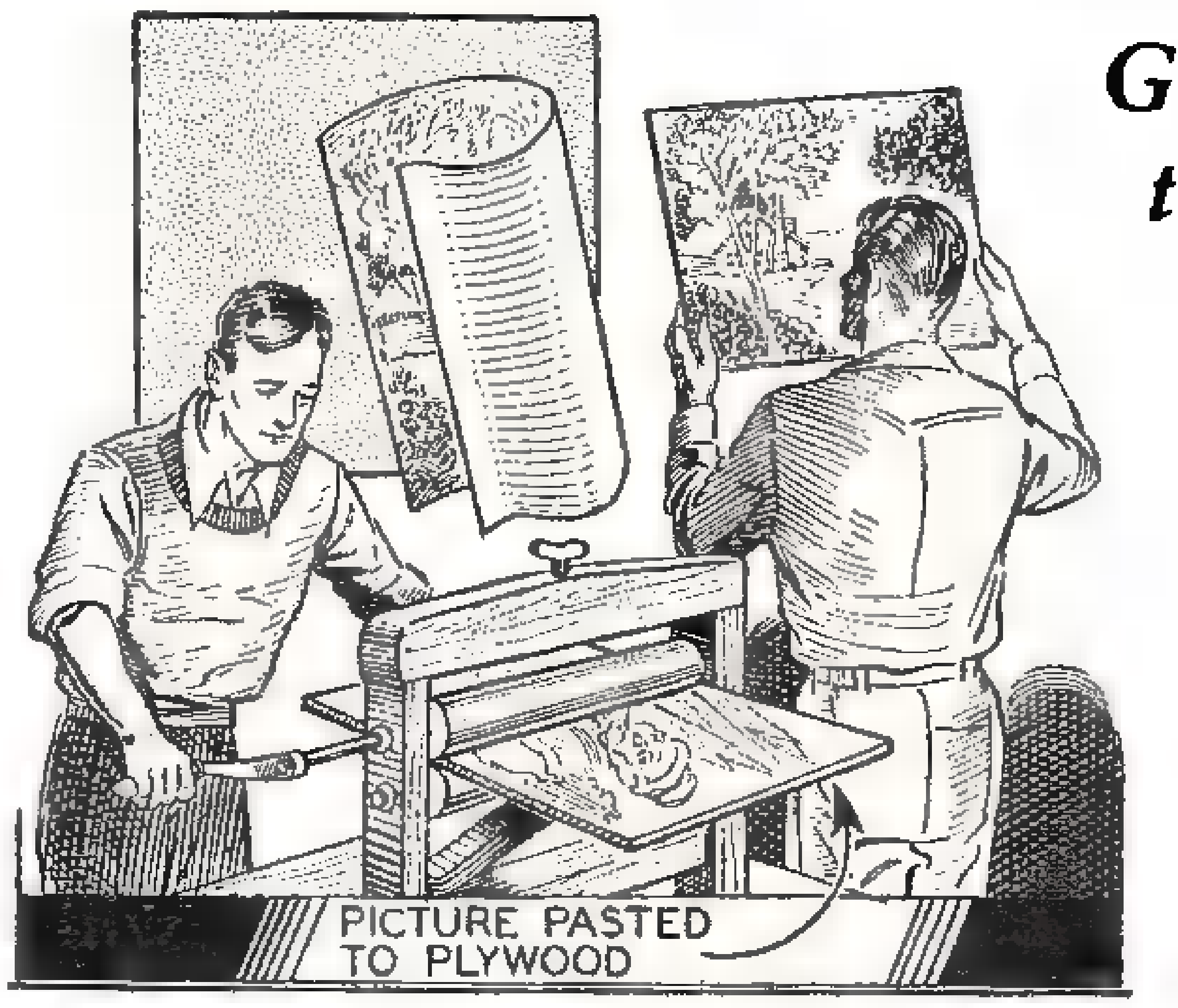
An Optical Toy for the Kiddies

HERE'S one of the oldest forms of the cinema—an optical illusion which you can make for your children with very little trouble. It was used in physics classrooms in the seventies to illustrate the well known phenomena, "persistence of vision." Take a fairly stiff piece of cardboard and on one side of it, in the center, place a picture of an empty bird cage. On the opposite side draw a bird, or a parrot, or some fitting object. When the card is spun between two tightly wound strings the bird will appear to be imprisoned in the cage. Other types of action you can invent readily yourself, and have no end of fun.—Geo. W. Davidson.


FISH CORD
BITS OF BROKEN MIRROR EMBEDDED IN PUTTY
OLD SLOP JAR

An Effective Scarecrow for the Gardens

A SIMPLE and effective scarecrow that will keep any and all kinds of not only birds, but rabbits and other rodents out of the garden or fruit and berry patches is easily made from an old graniteware slop jar and a few pieces of broken mirror. The jar is given a coat of putty thinned to a paste with turpentine and linseed oil, making the coat about one-eighth-inch thick. Small pieces of broken mirror are then pressed all over the outside of the jar. In a slight breeze, it will swing and turn, reflecting sun's rays in all directions. These small rays strike birds in the eye and scare them away.—A. N. Waychoff.

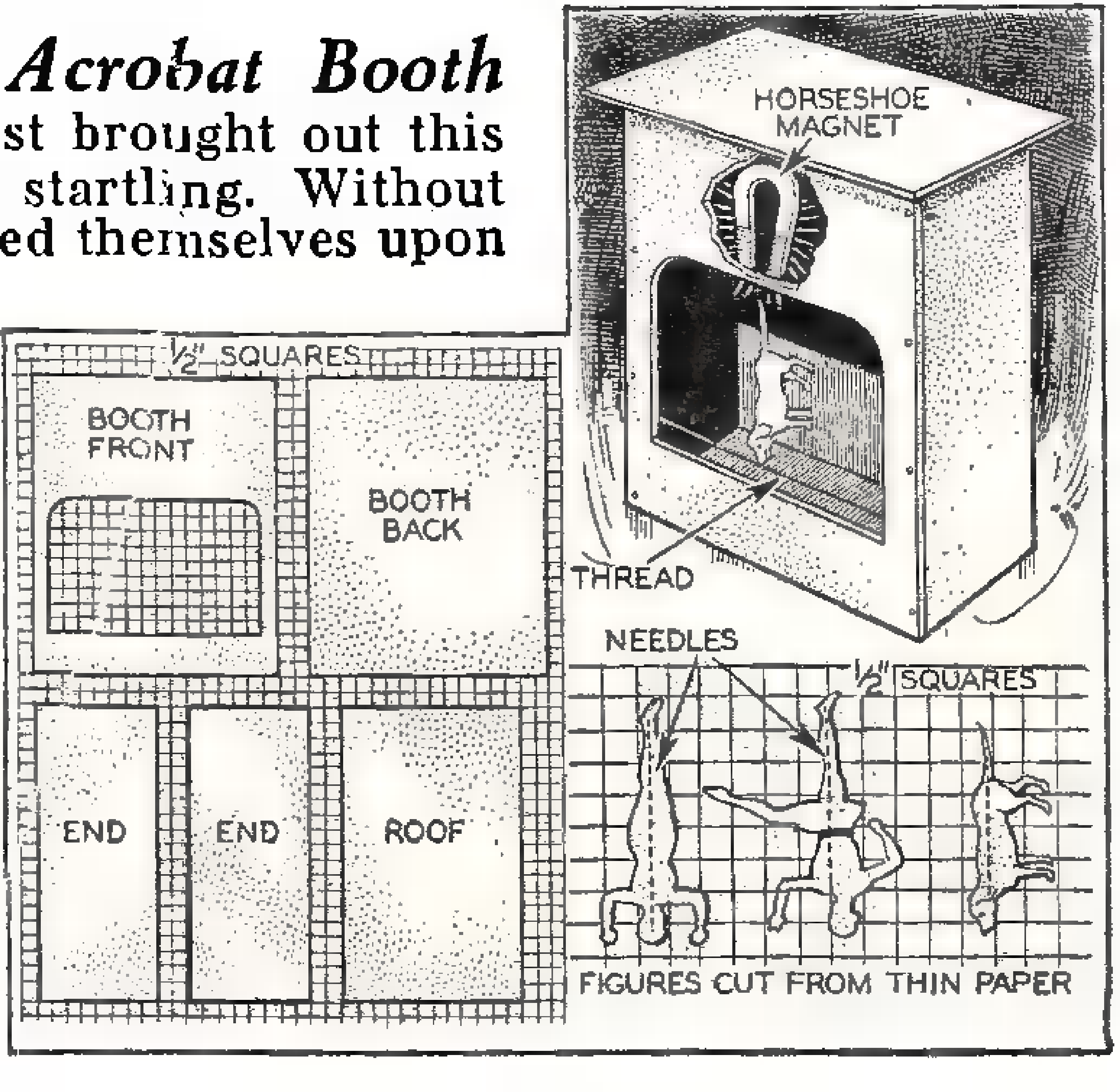


Gluing Pictures to Ply Boards

FOR those making jig-saw puzzles, the gluing of the pictures to the plywood often becomes a problem. The best job can be done with a clothes wringer. Have the glue warm and also warm the plywood itself before applying the glue. Pat it down commencing at the center and radiating the pressure towards the edges of a piece of plywood. When this is done, place a sheet of waxed paper over the picture and run the whole affair through a clothes wringer with proper tension. Then cover with a piece of waxed paper, a board and last a weight.—L. B. Robbins.

Entertain Party Guests With This Acrobat Booth

THE other evening at a party the young host brought out this acrobat booth and the effect certainly was startling. Without any apparent reason, the paper figures balanced themselves upon the thread which represented a tight wire. This acrobat booth was shown in a darkened room with the light from a flash light played upon the booth opening, thus increasing the effect. There were many guesses and explanations, but it took the owner to set us right about these mysterious figures and what kept them balanced on the thread. Materials needed for this booth are enough wood to make the structure, a bit of thread, some figures cut from thin paper, a few needles, rubber cement and a good horseshoe magnet. Cut the ends, roof, front and back from thin wood and nail together. Fasten the magnet over the opening as shown in the drawing at right.—D. R. Van Horn.

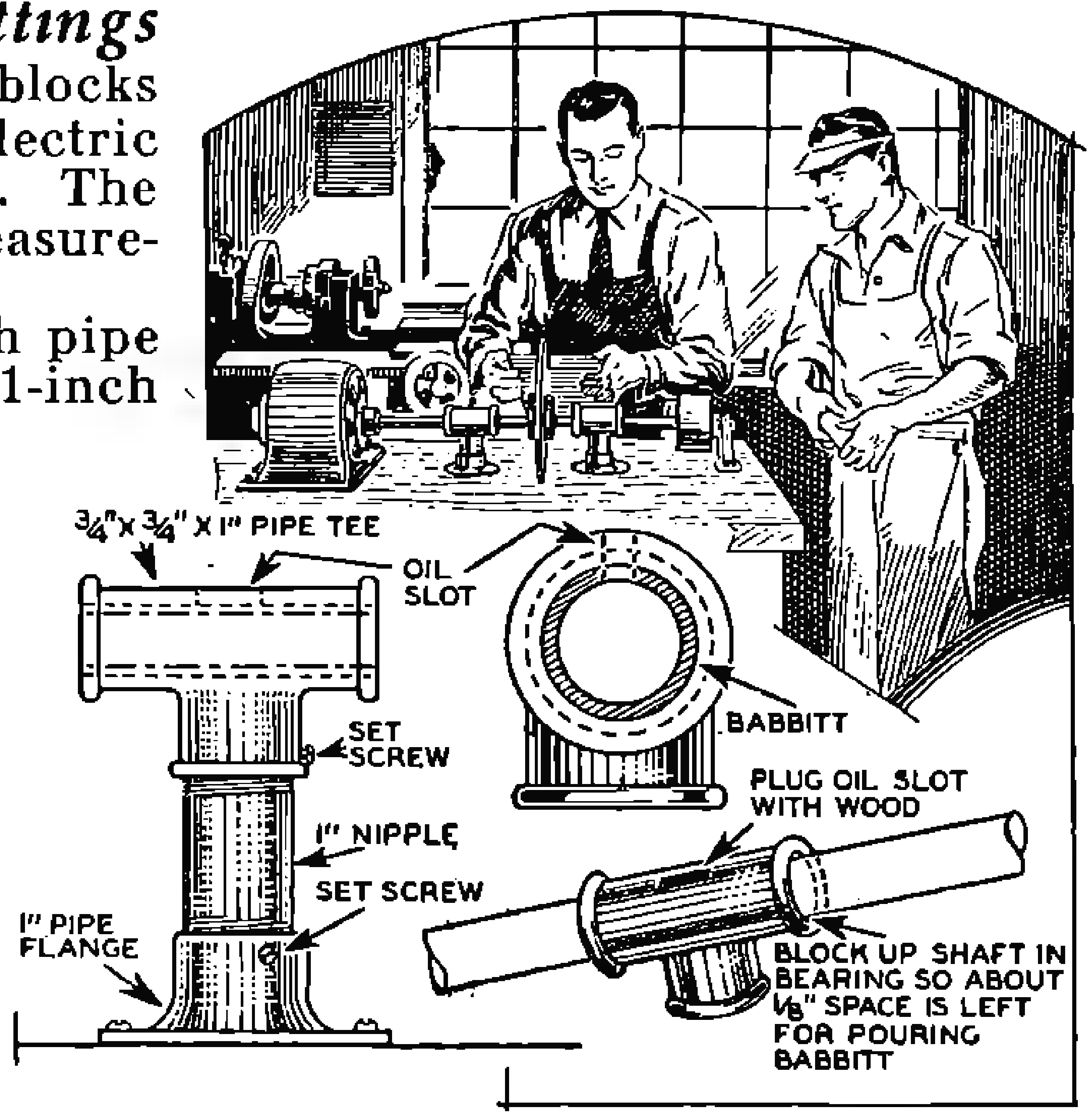


Miscellaneous Handyman Items

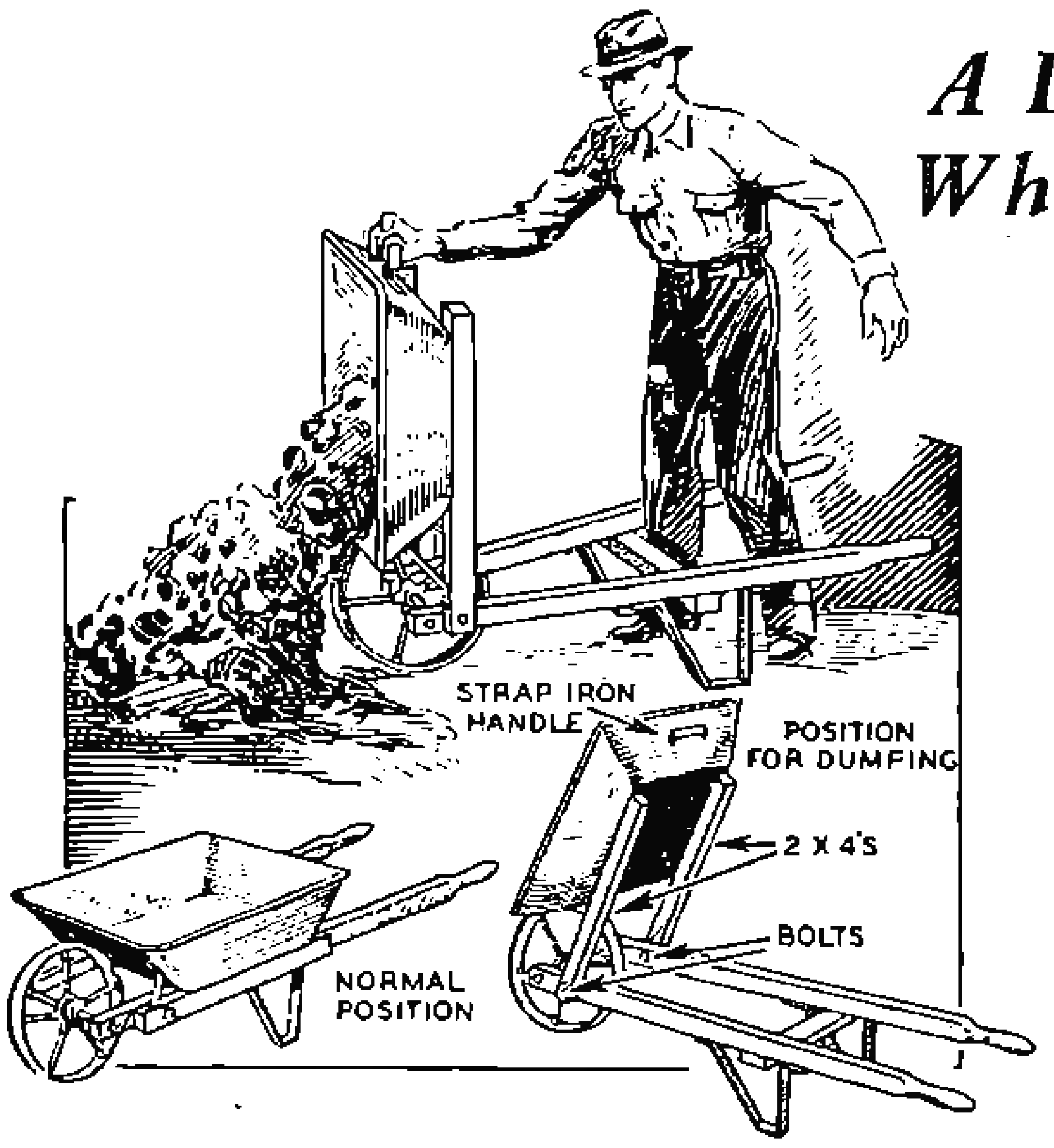
Countershaft Bearings From Pipe Fittings

HERE is the way to make excellent pillow blocks and countershaft bearings for the small electric bench tools so popular at the present time. The common shaft size is one-half inch so all measurements are shown for that size shaft.

The bearings are composed of ¾x¾x1 inch pipe tees. Into the 1-inch opening is threaded a 1-inch nipple and this is then threaded into a 1-inch pipe flange. The height can be gauged by the length of the nipple used. Drill and tap two small holes; one in the 1-inch part of the tee and one in the flange opening. These are for set-screws to prevent the parts from turning. Melt the babbitt and then pour rapidly into the top opening of the tee until the tee is completely filled around the shaft. Withdraw shaft when cool.—L. B. Robbins.


¾"x¾"x1" PIPE TEE
OIL SLOT
SET SCREW
1" NIPPLE
SET SCREW
1" PIPE FLANGE
BABBITT
PLUG OIL SLOT WITH WOOD
BLOCK UP SHAFT IN BEARING SO ABOUT ⅛" SPACE IS LEFT FOR POURING BABBITT

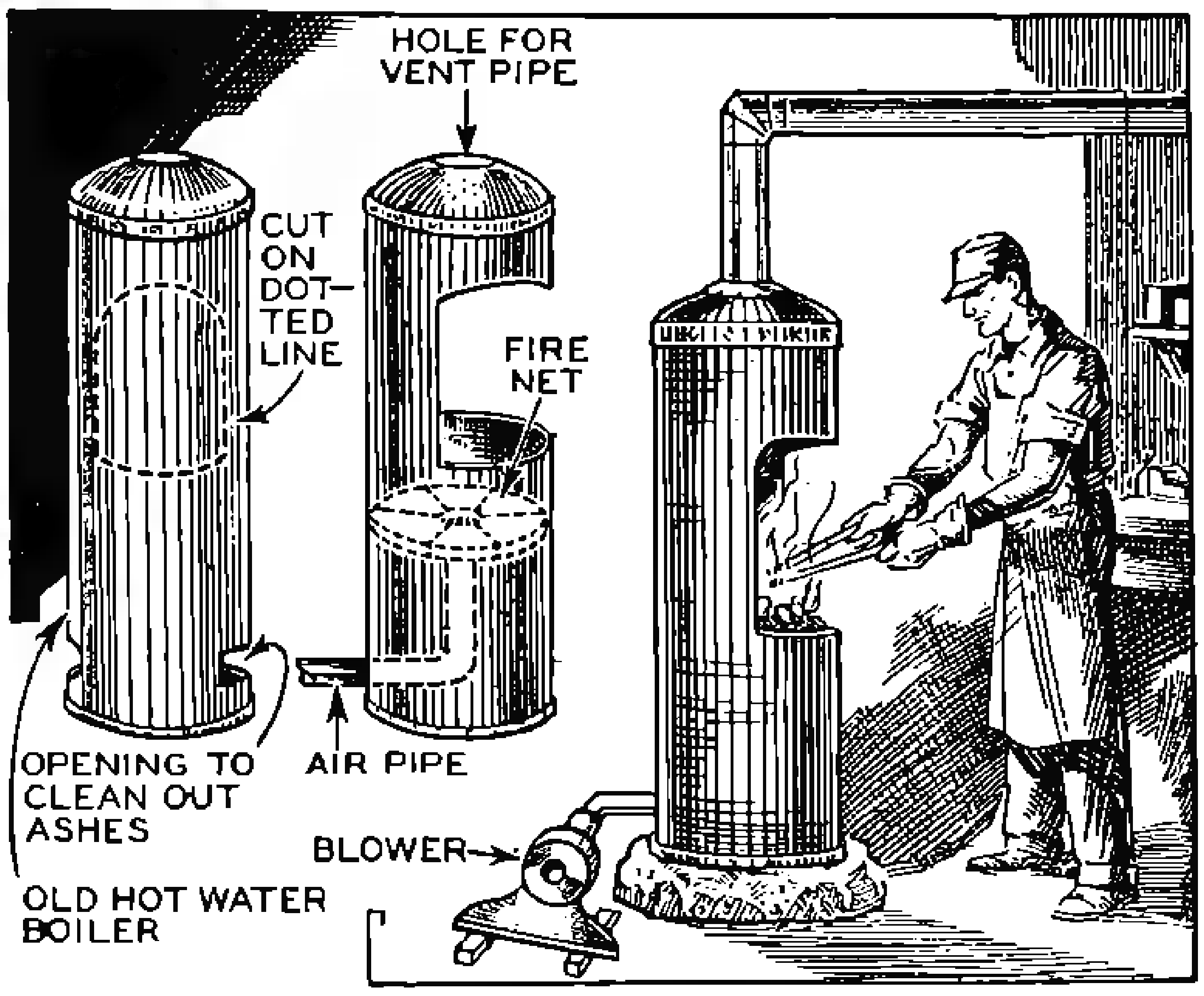
A Dumping Wheelbarrow

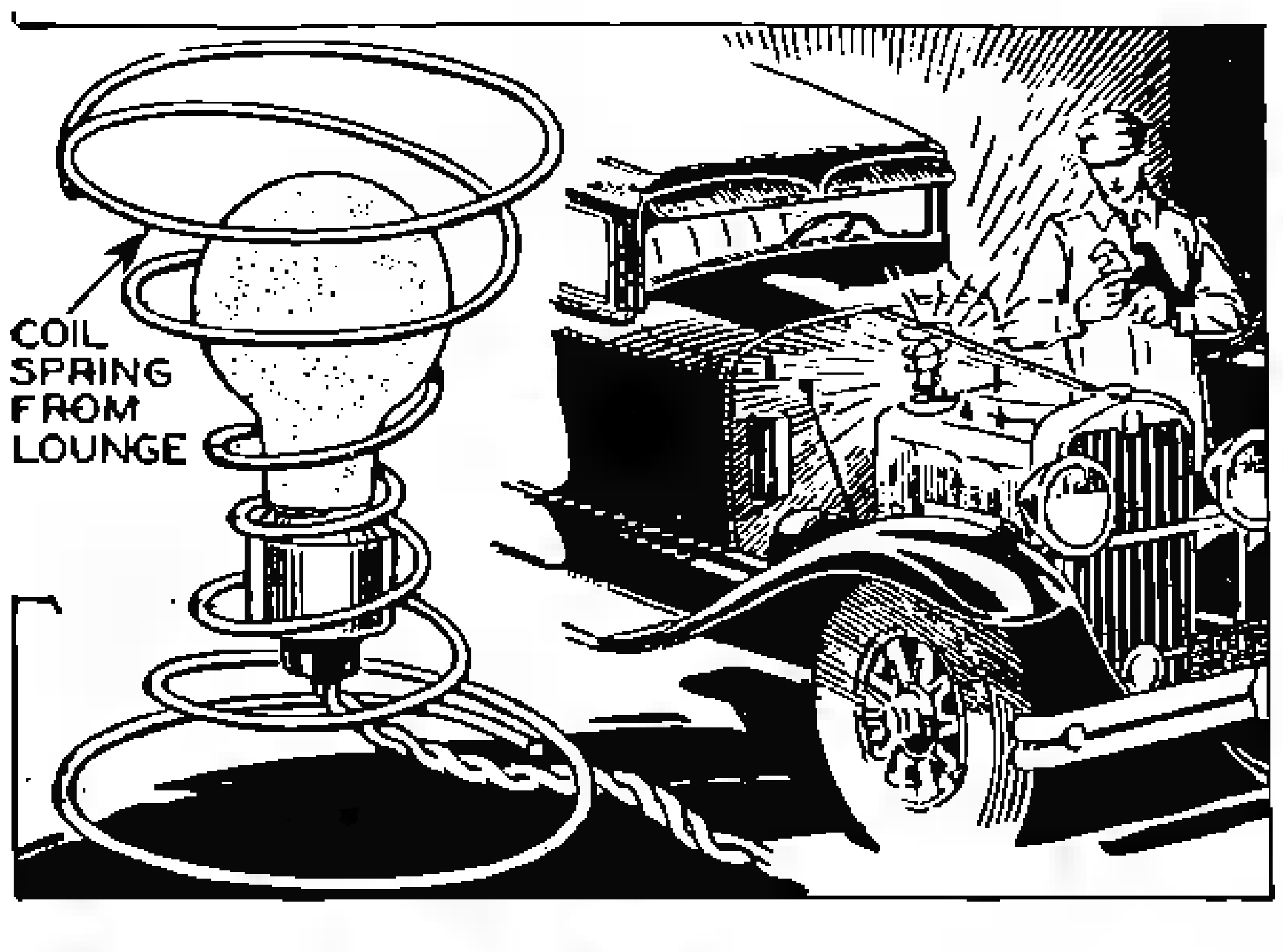

STRAP IRON HANDLE
POSITION FOR DUMPING
2 x 4's
BOLTS
NORMAL POSITION

A NOVEL and effective way of dumping a wheelbarrow can be accomplished by mounting the body of a wheelbarrow on two extra pieces of wood which are fastened near the wheel with two bolts so the body can be swung forward and free from the handle bars, when dumping. This eliminates lifting the weight of the entire wheelbarrow. A handle for controlling the tipped up portion of the barrow is also shown in the drawing. This is made from strap iron and is riveted on the back of the bucket. The whole arrangement will save much muscular exertion. Most any old wheelbarrow is suitable for use with this stunt.—Fred W. Schneider.

Old Range Boiler Makes Ideal Forge

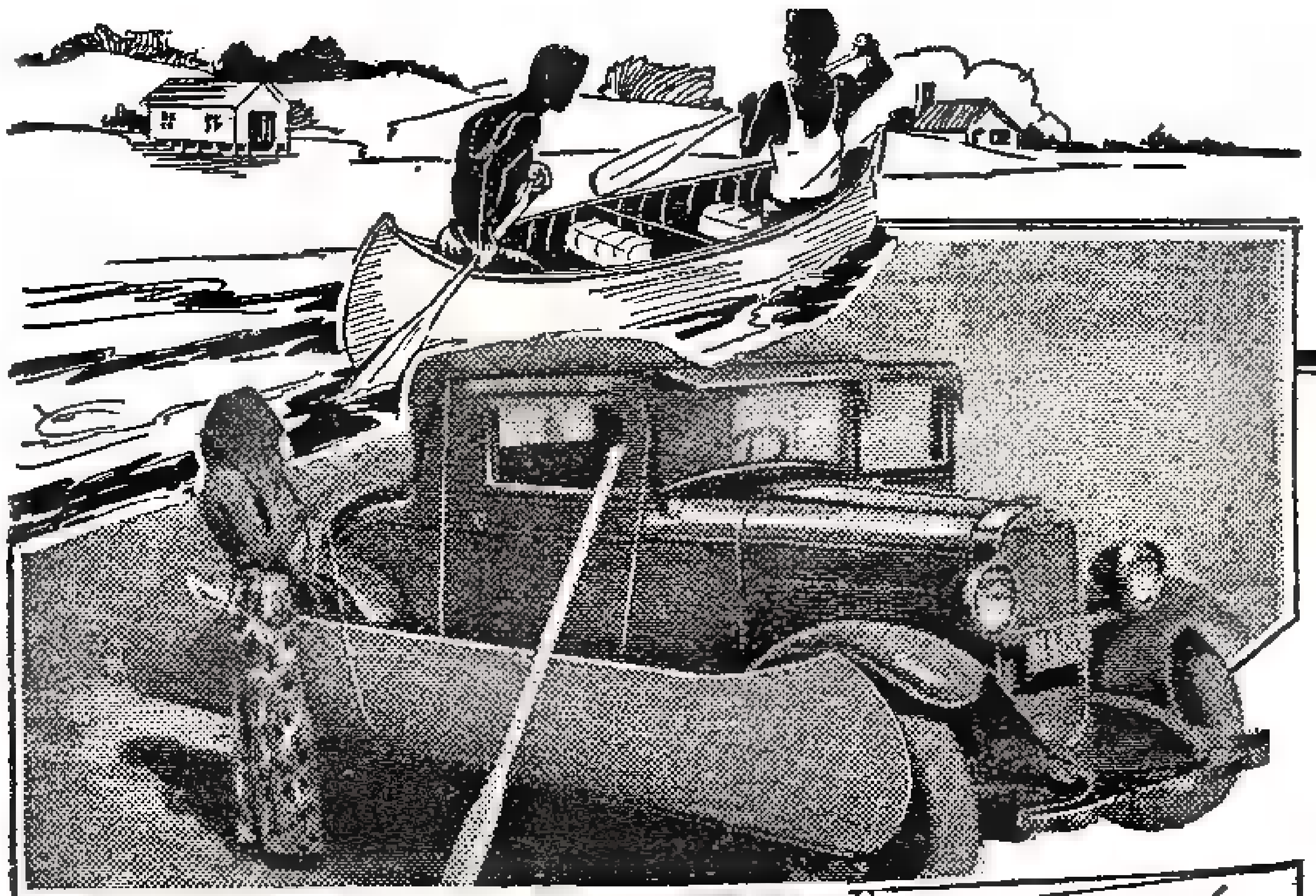
IN THE accompanying drawing is shown a home-made forge that is made from an old range boiler that is a valuable addition to any home or farm shop. The boiler is taken and cut out on the dotted lines for the forge itself, also a small hole for a cleanout for ashes and a hole for the inlet of air. Also a hole is cut for a smoke pipe, which is set on the top as shown. A suitable air pipe is run in and bent up to the fire pot, shown by the dotted lines, which may be an old wash basin filled with concrete or fire clay. The opening cut in the dotted lines leaves the opening for a throat to place work in the fire.—A. H. Waychoff.


HOLE FOR VENT PIPE
CUT ON DOTTED LINE
FIRE NET
OPENING TO CLEAN OUT ASHES
AIR PIPE
BLOWER
OLD HOT WATER BOILER


COIL SPRING FROM LOUNGE

Fool Proof Trouble Light Is Handy Article

HERE is a light holder that may be jumped on, dropped or rolled without much trouble from the light source. Of course, you have to take that word "jumping" with a grain of salt, but it is comfortable to know you have to work to hurt this service light. A coil spring from a lounge or any double taper bed spring will do the trick. Put the bulb in one side and the socket in another, and screw them together. It's advisable to tape the wire to the top of the spring.—Altamount Cole.



A "DESERT

Not a real Old Town canoe, but an amateur's home built and very serviceable "Old Desert Town" canoe is described here by Mr. Murdoch, who built one in Texas. You can do likewise in graduating to the real thing.

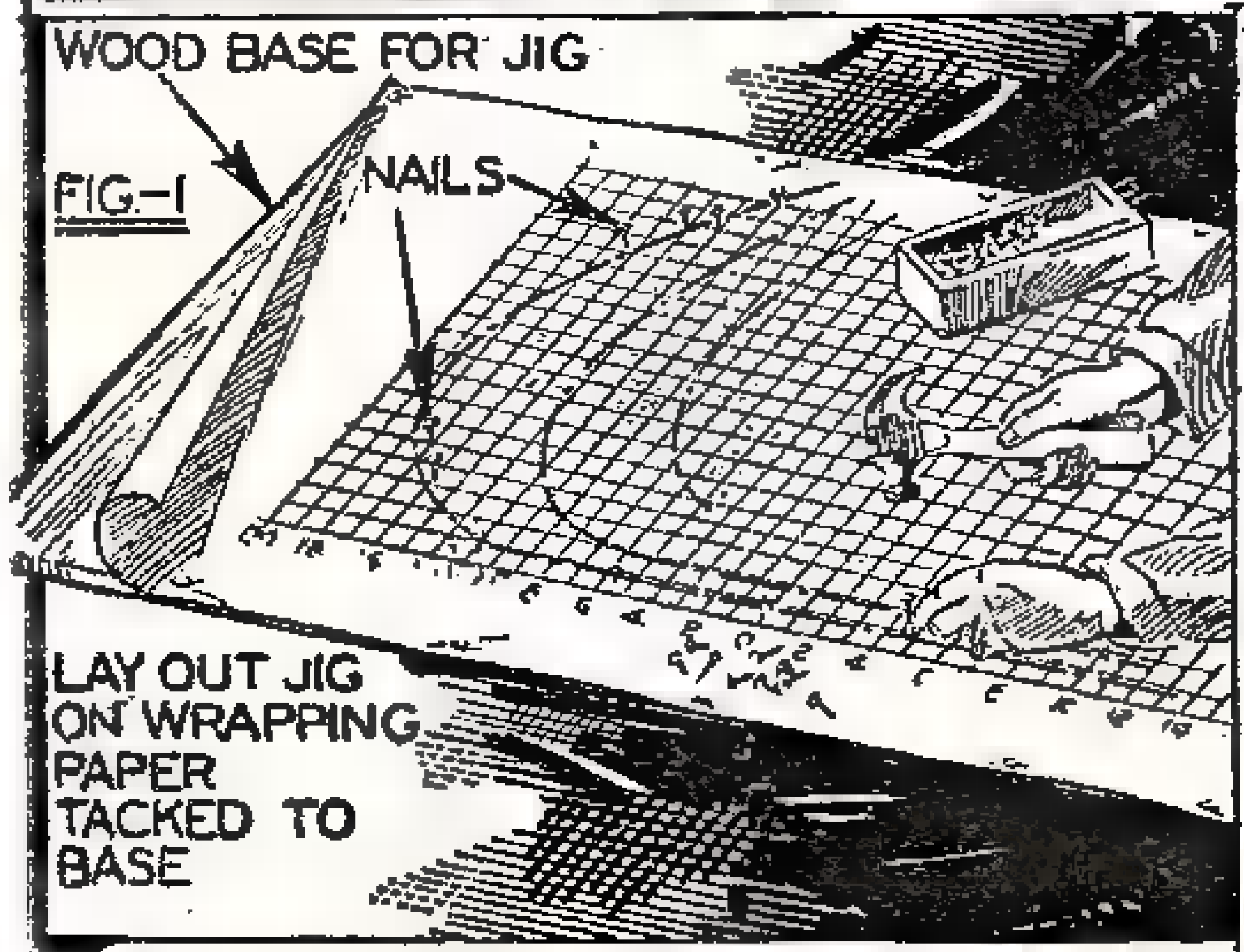

WOOD BASE FOR JIG
NAILS
LAY OUT JIG ON WRAPPING PAPER TACKED TO BASE

FIG.-1

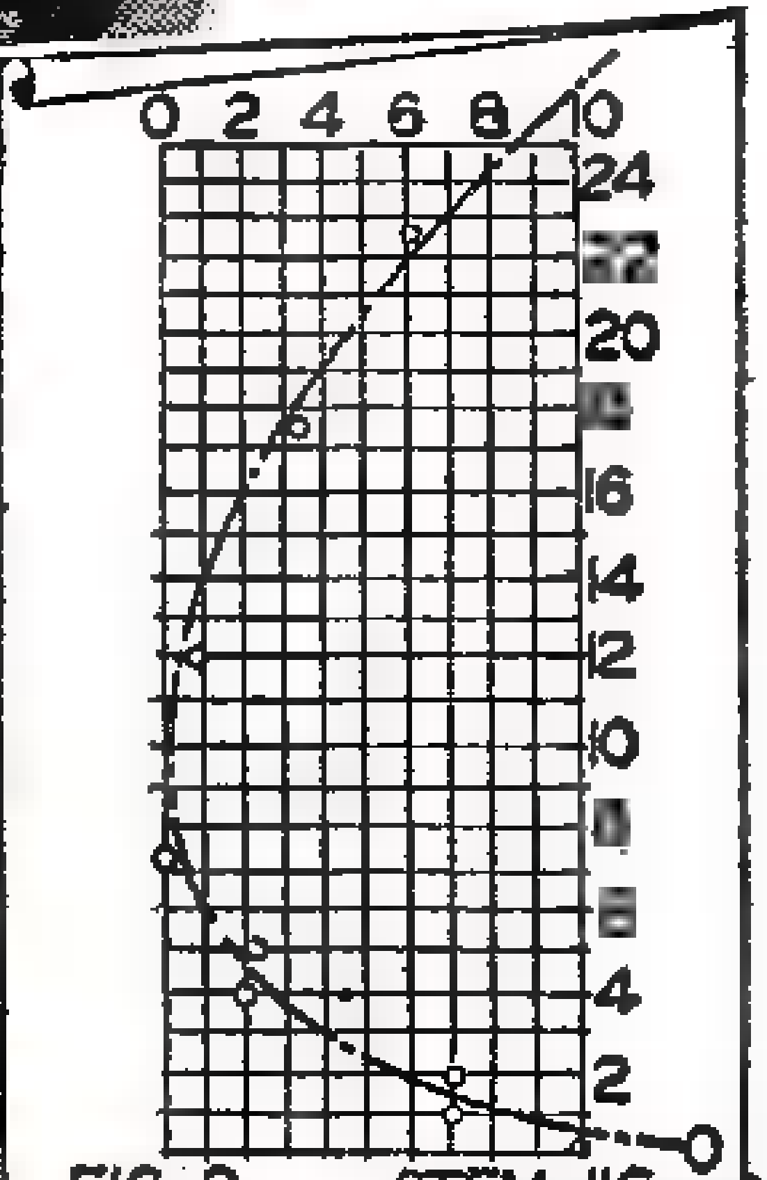

0 2 4 6 8 10
24
22
20
18
16
14
12
10
8
6
4
2
0
STEM JIG

FIG.-2

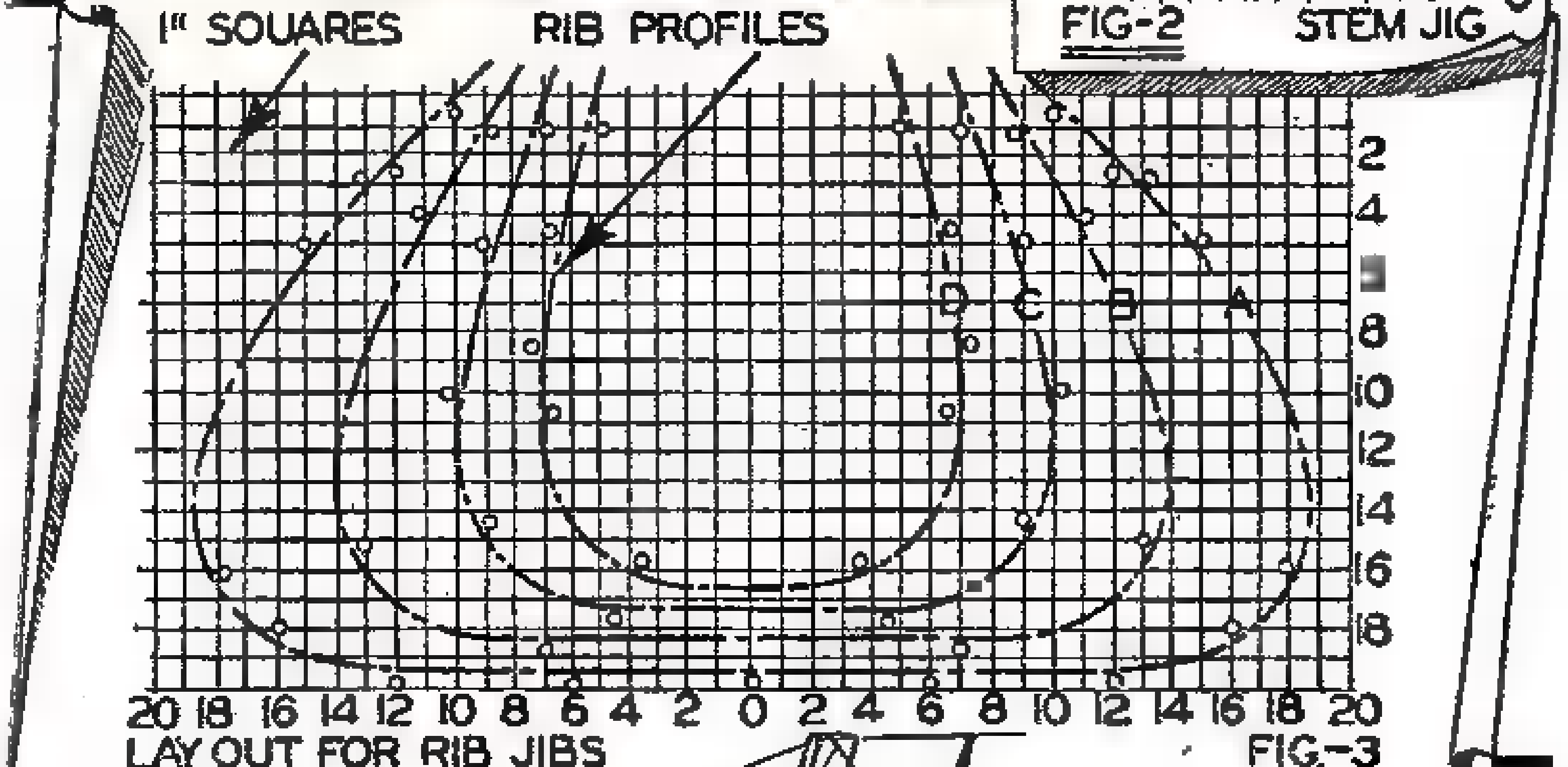

1" SQUARES
RIB PROFILES
D C B A
2
4
6
8
10
12
14
16
18
20 18 16 14 12 10 8 6 4 2 0 2 4 6 8 10 12 14 16 18 20
LAY OUT FOR RIB JIBS

FIG.-3

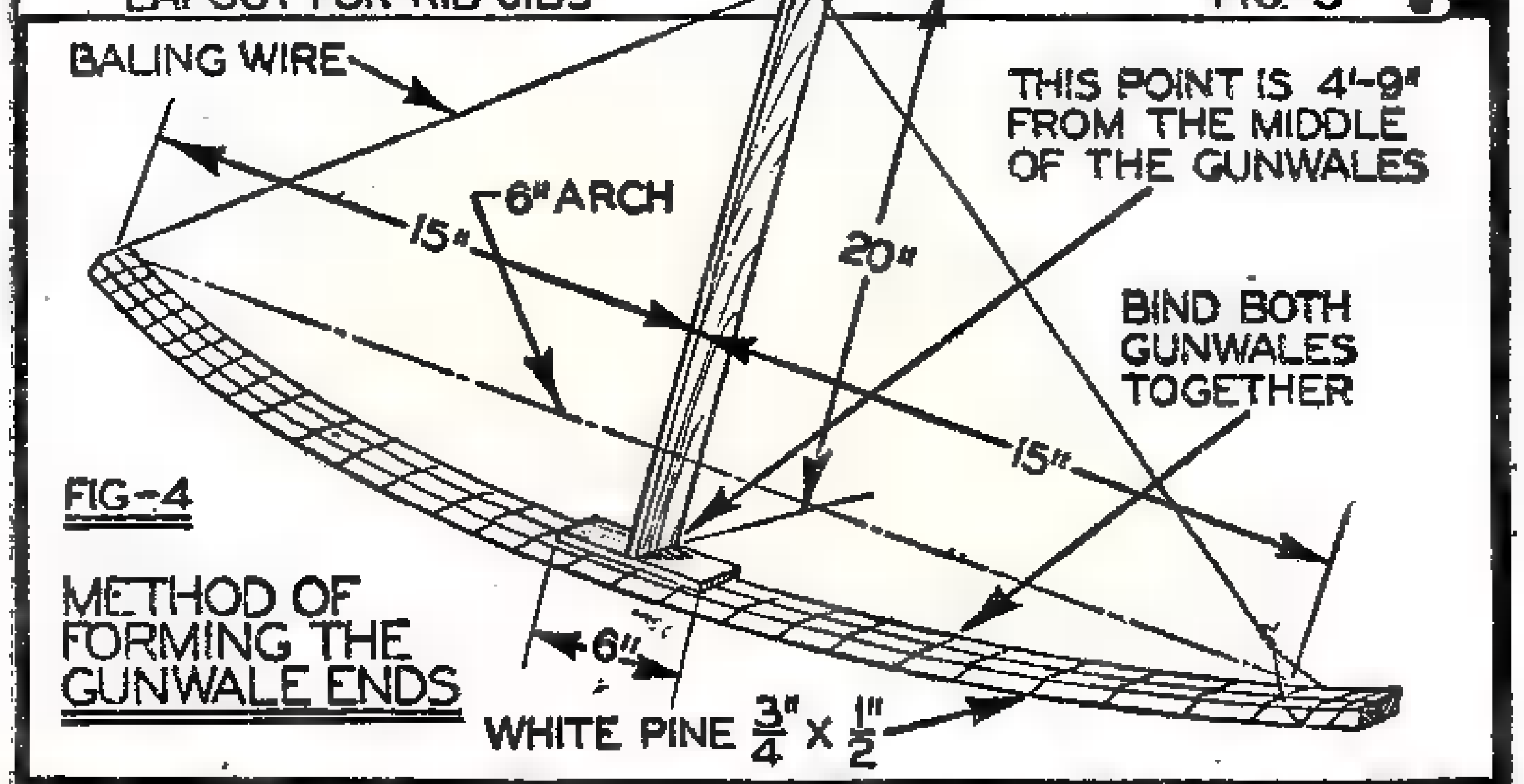

BALING WIRE
THIS POINT IS 4'-9" FROM THE MIDDLE OF THE GUNWALES
6" ARCH
15"
20"
BIND BOTH GUNWALES TOGETHER
15"
6"
WHITE PINE 3/4" x 1/2"

FIG.-4

METHOD OF FORMING THE GUNWALE ENDS

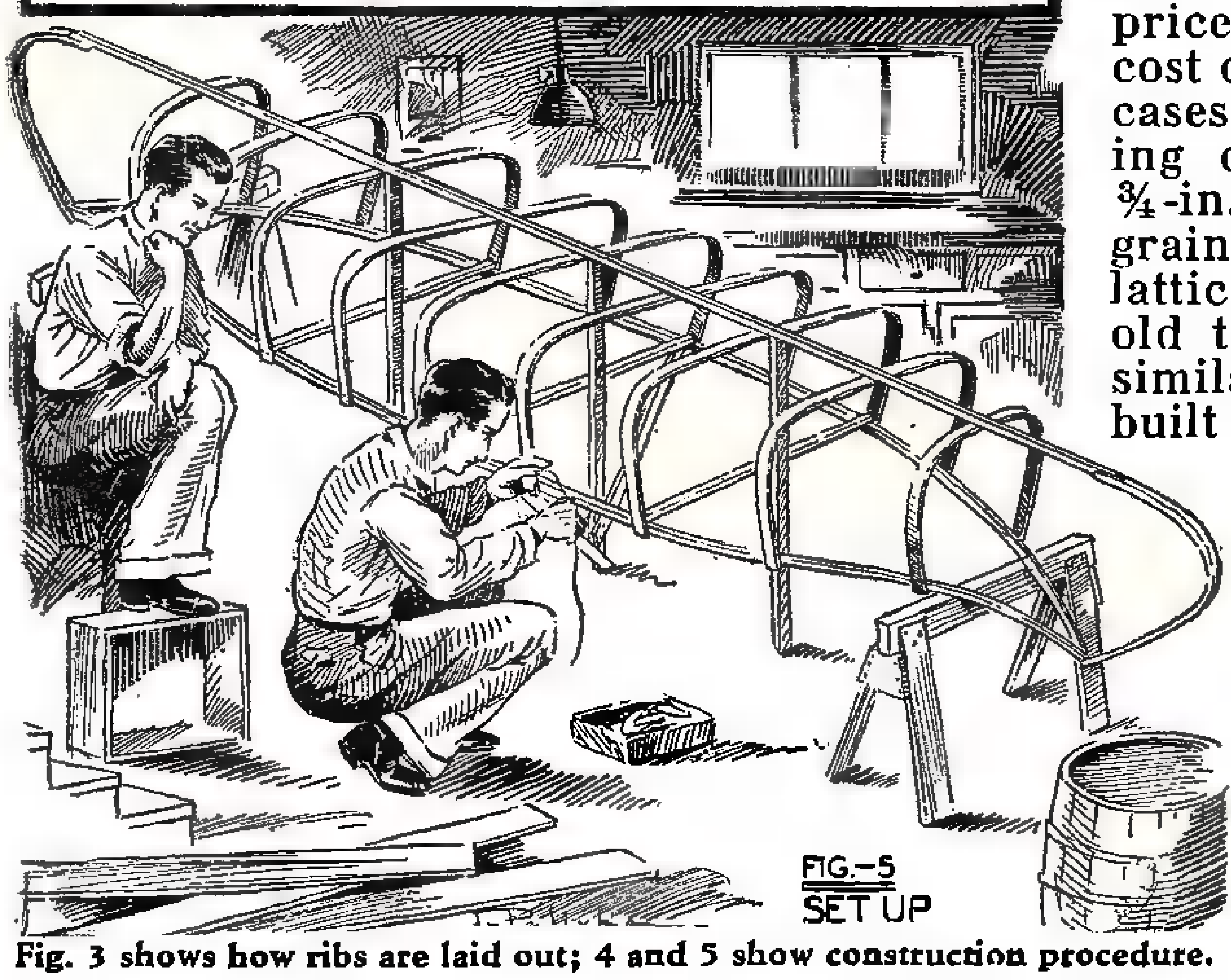


FIG.-5 SET UP

Fig. 3 shows how ribs are laid out; 4 and 5 show construction procedure.

FOR us who live where boats of any sort, even toys, are unusual, the simple joys of gliding over the smooth surface of creek or lake or bobbing over the small waves of cove or bay are experiences read about in books, or at best witnessed in some moving picture. But with modern engineering and the construction of dams and extensive irrigation systems, there has come to even the desert dweller the opportunity to do a little boating on his own. Naturally we don't feel like putting out any considerable amount of labor or money on factory-built boats but we would like to have a light, serviceable craft of some kind to take with us on jaunts and picnics to the distant river, canal or reservoir. The duck season will be around again soon and those otherwise inaccessible hideouts can be reached if we have our portable, light draft boat along. Thirty hours spare time and at most $10.50 in cash will provide the missing canoe, for which the materials listed at the end of this article must be gathered together.

For typographical reasons we cannot run this list here, so turn to the end of the article now if you want to learn the cost and function of the parts.

The prices listed are the retail market prices for new, finished material. The cost of the canoe can be reduced, in most cases, one-half to two-thirds by the sawing of the different wood strips from ¾-in. white pine planks or other smooth-grained wood, by the use of discarded lattice or trellis work and the use of an old tent, porch curtain or tarpaulin. A similar canoe nine feet in length was built previously at a cash outlay of fifteen cents (for tacks) by using the makeshifts listed and asphalt roofing paint gleaned from forages into the left-overs of several new houses. The cash outlay on the canoe shown in the accompanying photographs was cut from $10.50 to $5.60 by using a discarded tarpaulin, nails, wire and one quart of paint on hand.

Place the barrel hoops and gunwale pieces in water to soak. The

"Town" Canoe

by A. A. MURDOCH

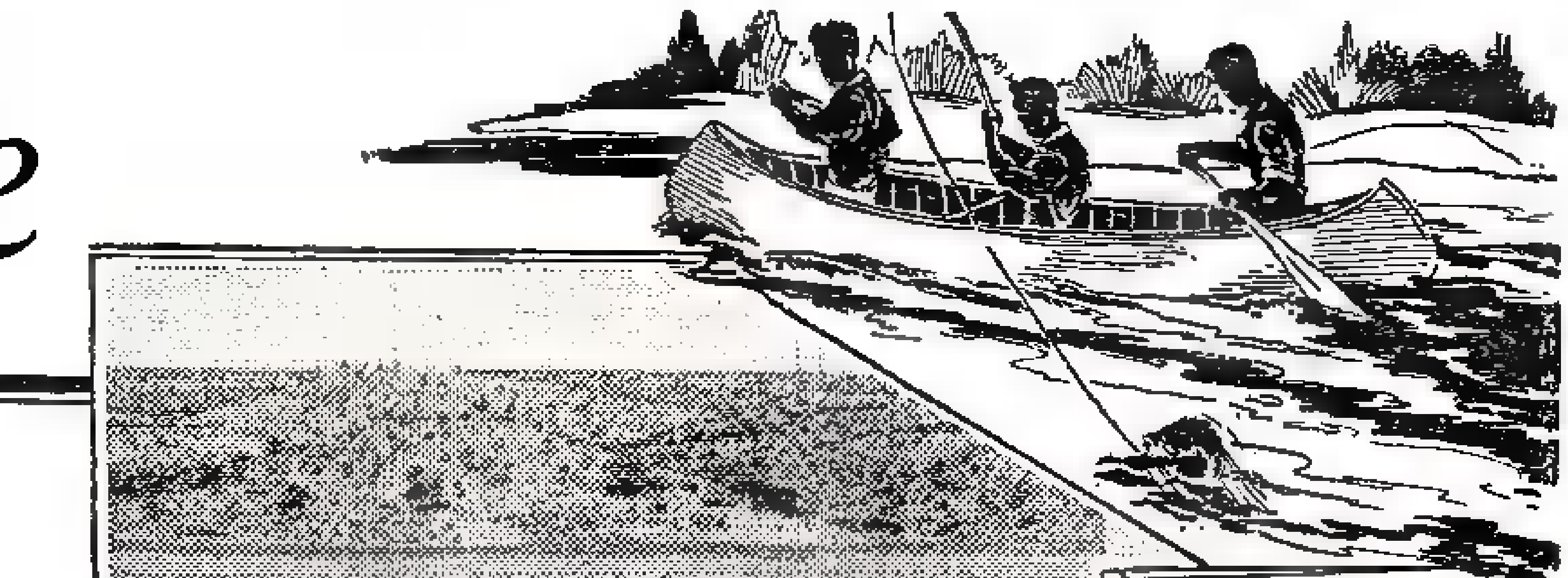
hoops will require only a tub or small pond of water but the gunwales will require a trough or ditch for entire submersion unless one end is done at a time, which was found to be satisfactory, and in which case three feet of each end is all that need be soaked. For want of anything more convenient, the rain trough under the eaves may be dammed temporarily and filled.

While the wood is soaking, construct the jig for forming the ribs and bow-pieces. Lay out on a sheet of wrapping paper the cross-section of 1-in. squares and locate the points indicated by Fig. 1. The wood base for the jig may be a barn door, loading platform or rough frame made of scrap lumber. Tack the paper layout to the wood base and drive 6D nails to a depth of one-half inch at the points marked.

When the hoops have soaked for at least five hours, bend them into the jigs. Three hoops are placed in form A, two in form B, two in form C, and one in form D. Two hoops remain; these are cut at the middle to make four pieces half length, which are bent all together into the bow-piece jig. When placing the hoops in the jig, alternate the thin and thick sides. This will allow more space and facilitate placing. The jig should be placed in the sun to dry for six hours.

Bending the Gunwales

Next bend the ends of the gunwales. If one end is being done at a time, this may be done while the other end is soaking. Bind both gunwales together with wire and bend by the method illustrated in Fig. 2, the center of the curve being 4 feet, nine inches from the middle of the gunwale. To hasten the drying, a tub was inverted over a gas stove with one burner lighted and the bent portion of the gunwales thrust up under the tub well away from above the flame to avoid burning the wood as it dried. Doing one end at a time does not make fast drying advantageous on the first end as it will dry while the other end is soaking sufficiently for bending. The same wire and form may be removed from the finished end and used again. To determine whether the wood is dry enough to hold its shape, loosen the wire at one end. If no appreciable loss of curve is noticed, it is safe to remove the wires. In damp climates the gunwales should be placed into their positions in the canoe without allowing them to lie around loose



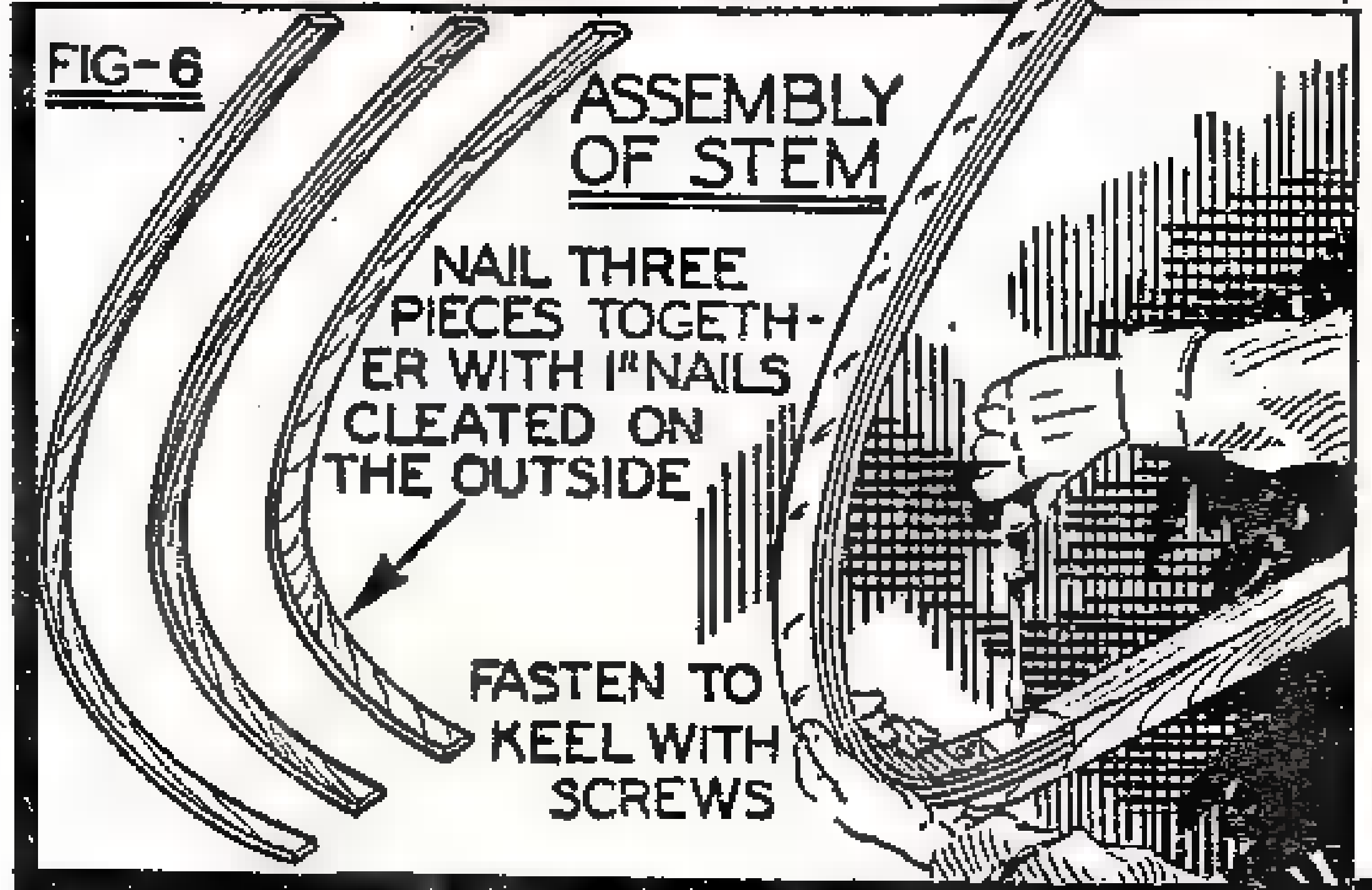


FIG-6

ASSEMBLY OF STEM
NAIL THREE PIECES TOGETHER WITH 1" NAILS CLEATED ON THE OUTSIDE
FASTEN TO KEEL WITH SCREWS

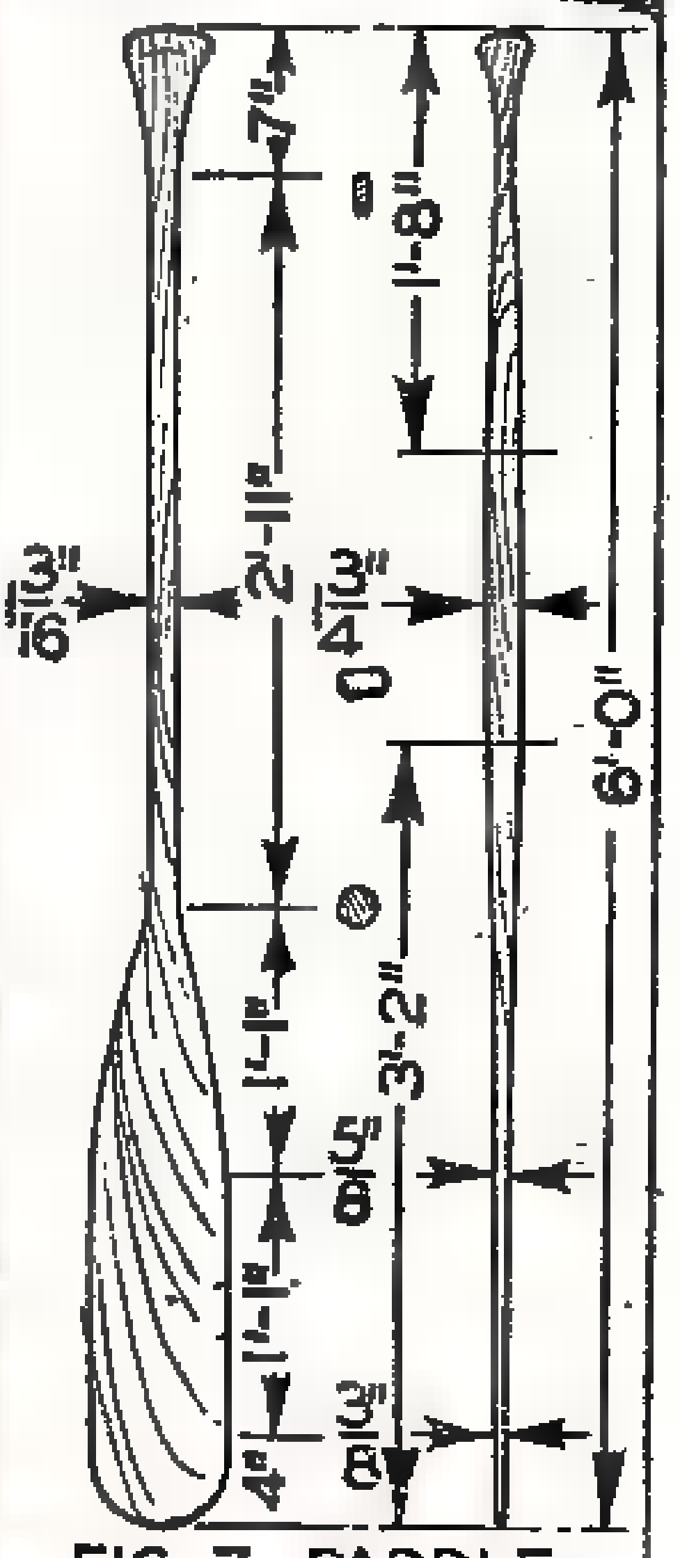


FIG-7 PADDLE

7"
1'-8"
2'-1"
1 3/16"
1 3/4"
6'-0"
3'-2"
1'-1"
5/8
1'-1"
3/8"
4"

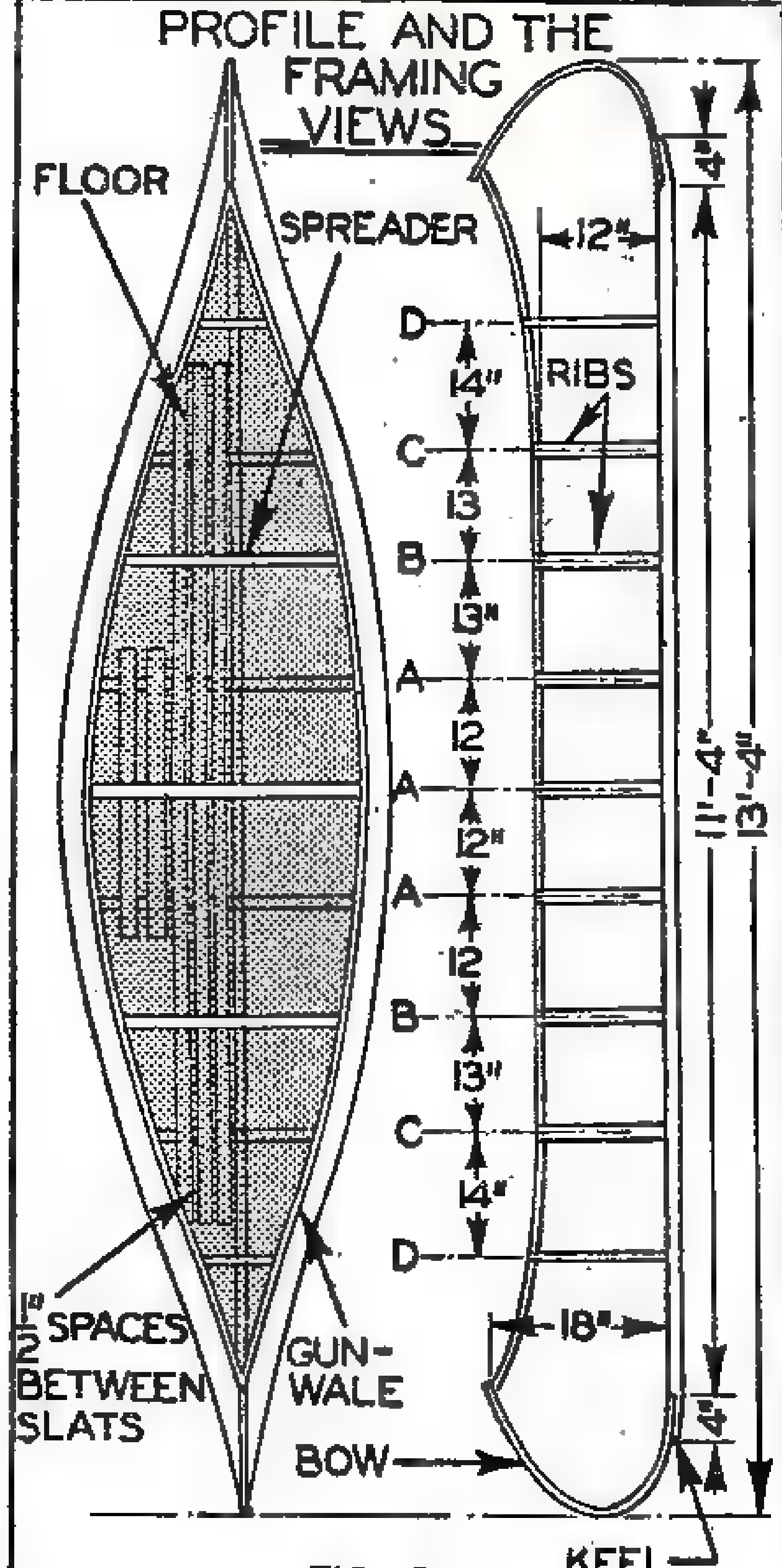
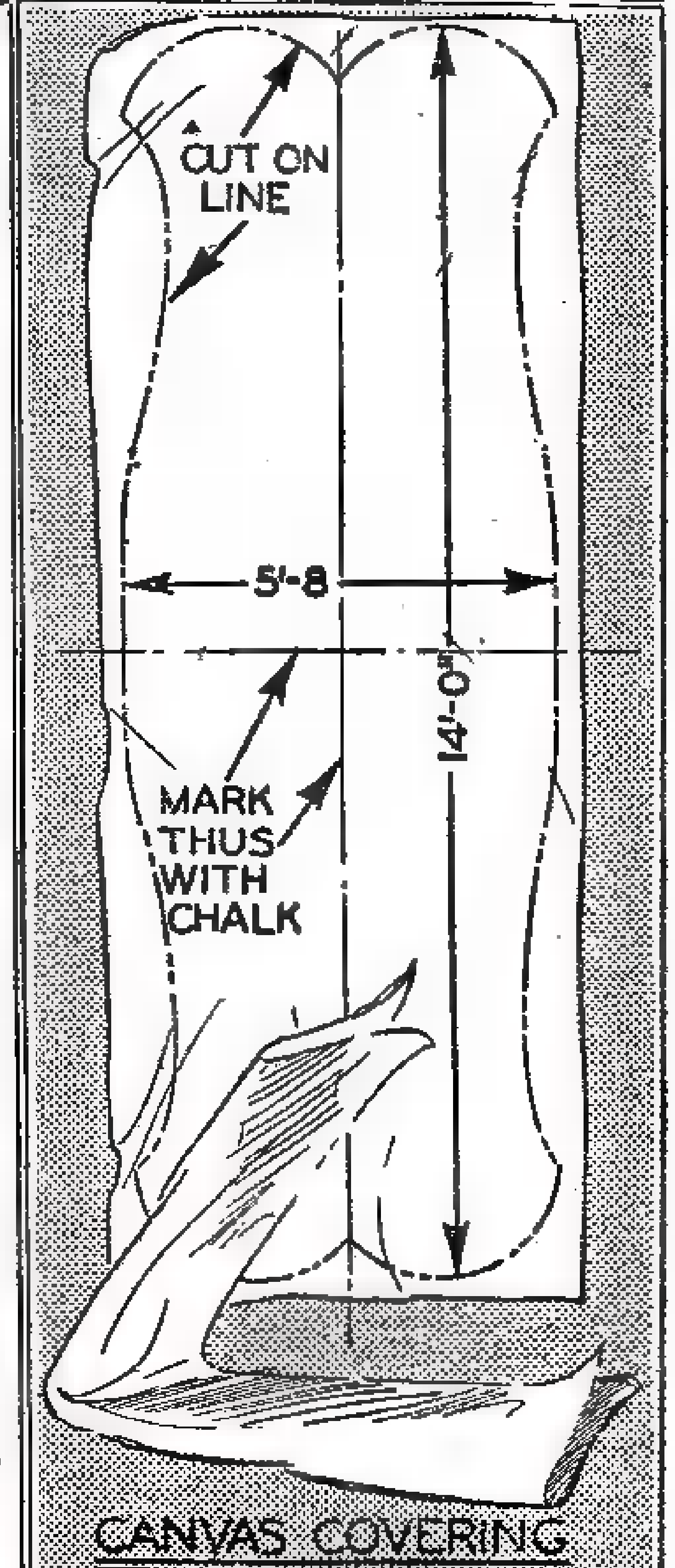


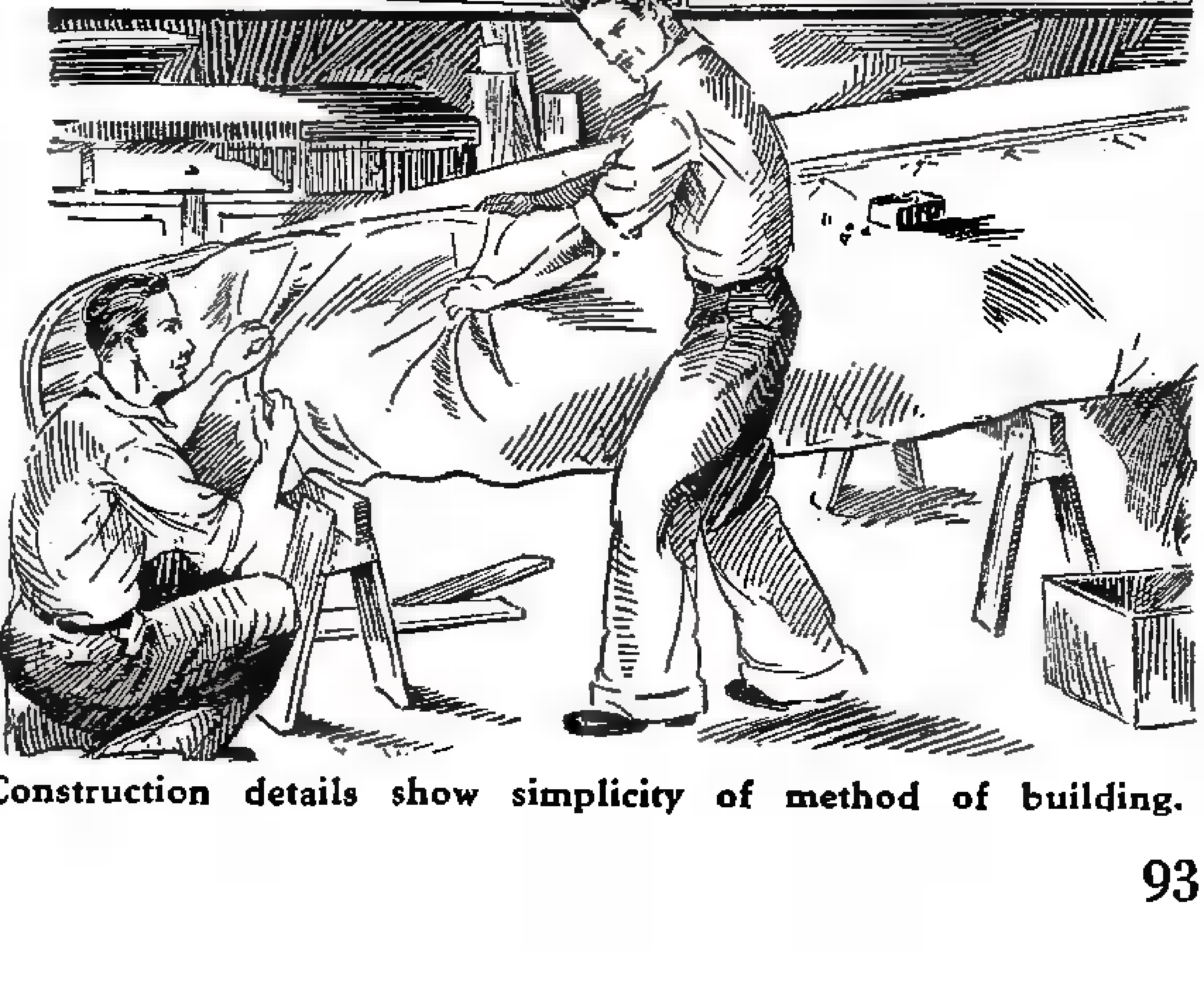
FIG-8

PROFILE AND THE FRAMING VIEWS
FLOOR
SPREADER
12"
D
14"
RIBS
C
13
B
13"
A
12
A
12"
A
12
B
13"
C
14"
D
18"
4"
11'-4"
13'-4"
4"
1/2" SPACES BETWEEN SLATS
GUN-WALE
BOW
KEEL



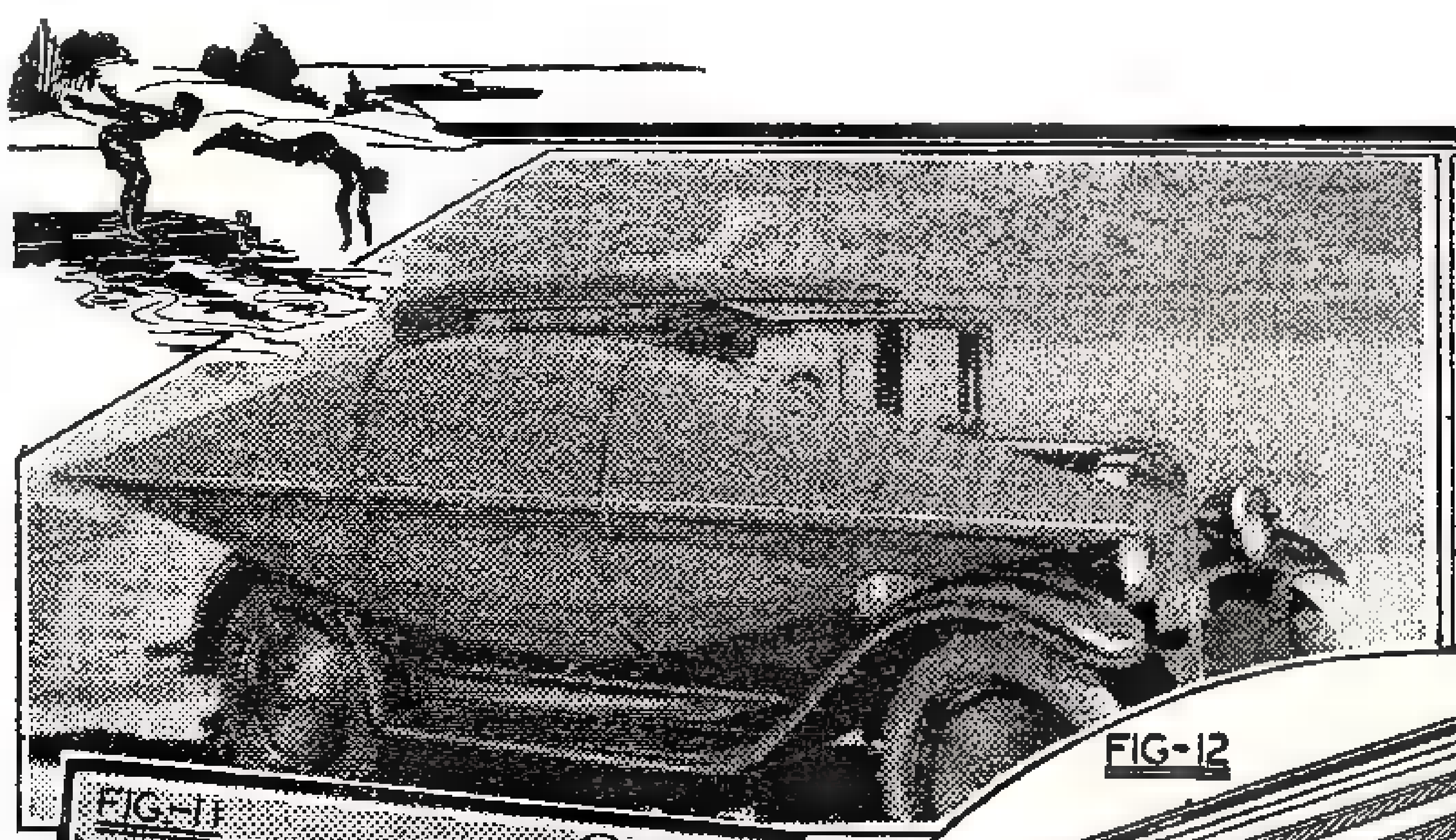
CANVAS COVERING FIG-9

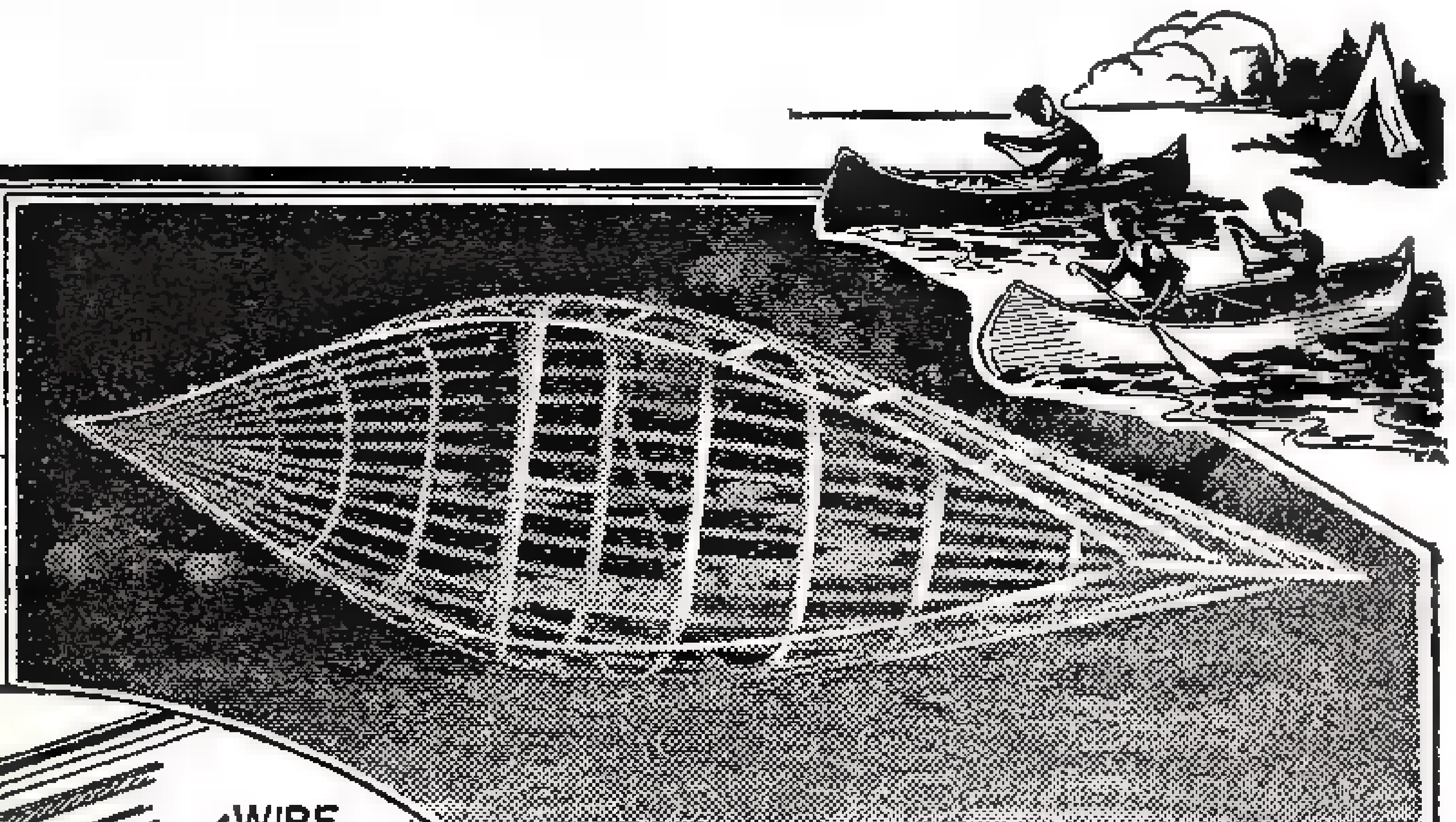
CUT ON LINE
5'-8
14'-0"
MARK THUS WITH CHALK



Construction details show simplicity of method of building.

Lightness and Portability Characterize Canoe Built From These Plans





Top view shows how the canoe is trussed to the side of a car for a long trek to fishing grounds. Below you see the method of fastening the outside stem over the canvas seam.

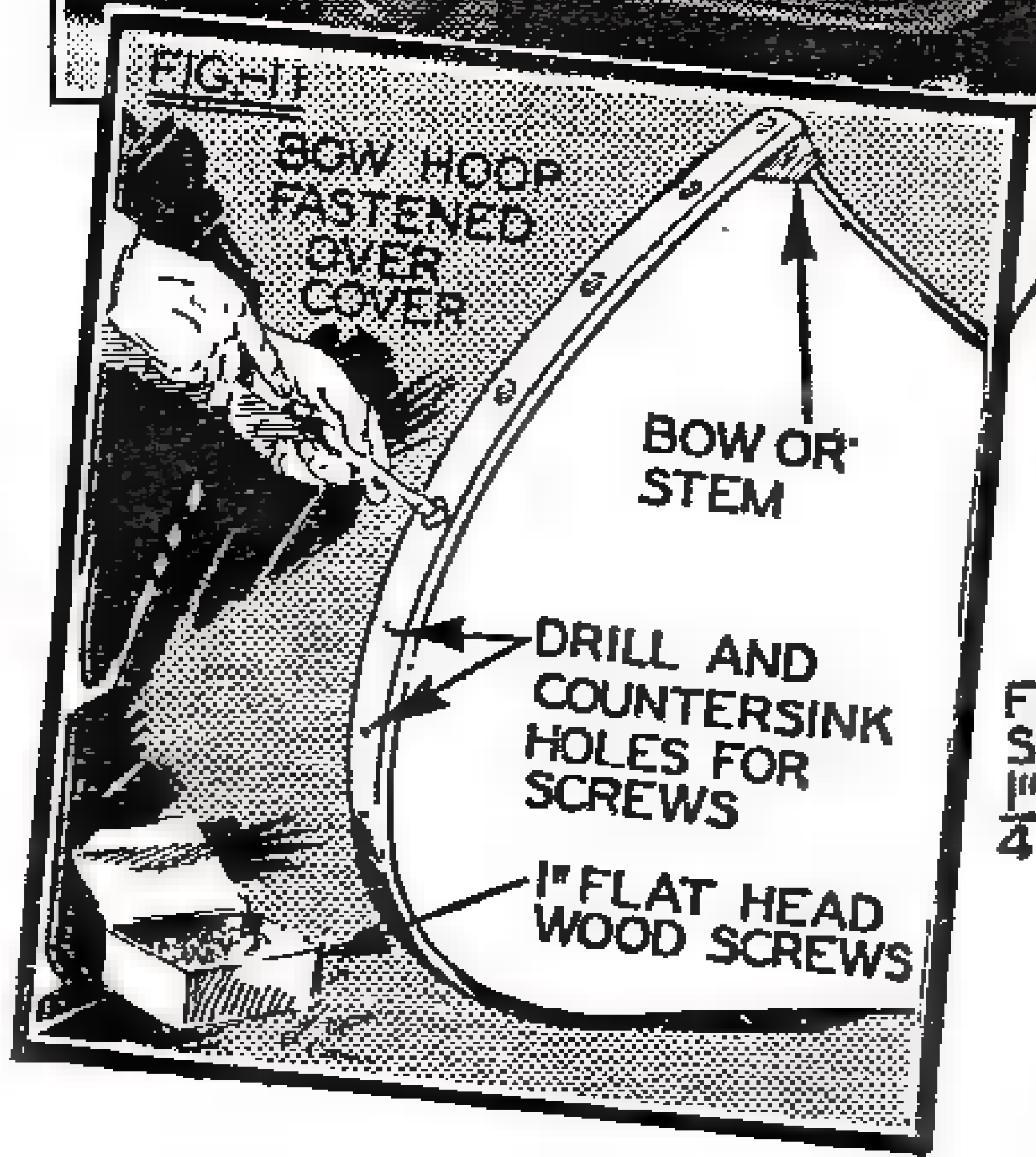


FIG-11
BOW HOOP FASTENED OVER COVER
BOW OR STEM
DRILL AND COUNTERSINK HOLES FOR SCREWS
1" FLAT HEAD WOOD SCREWS

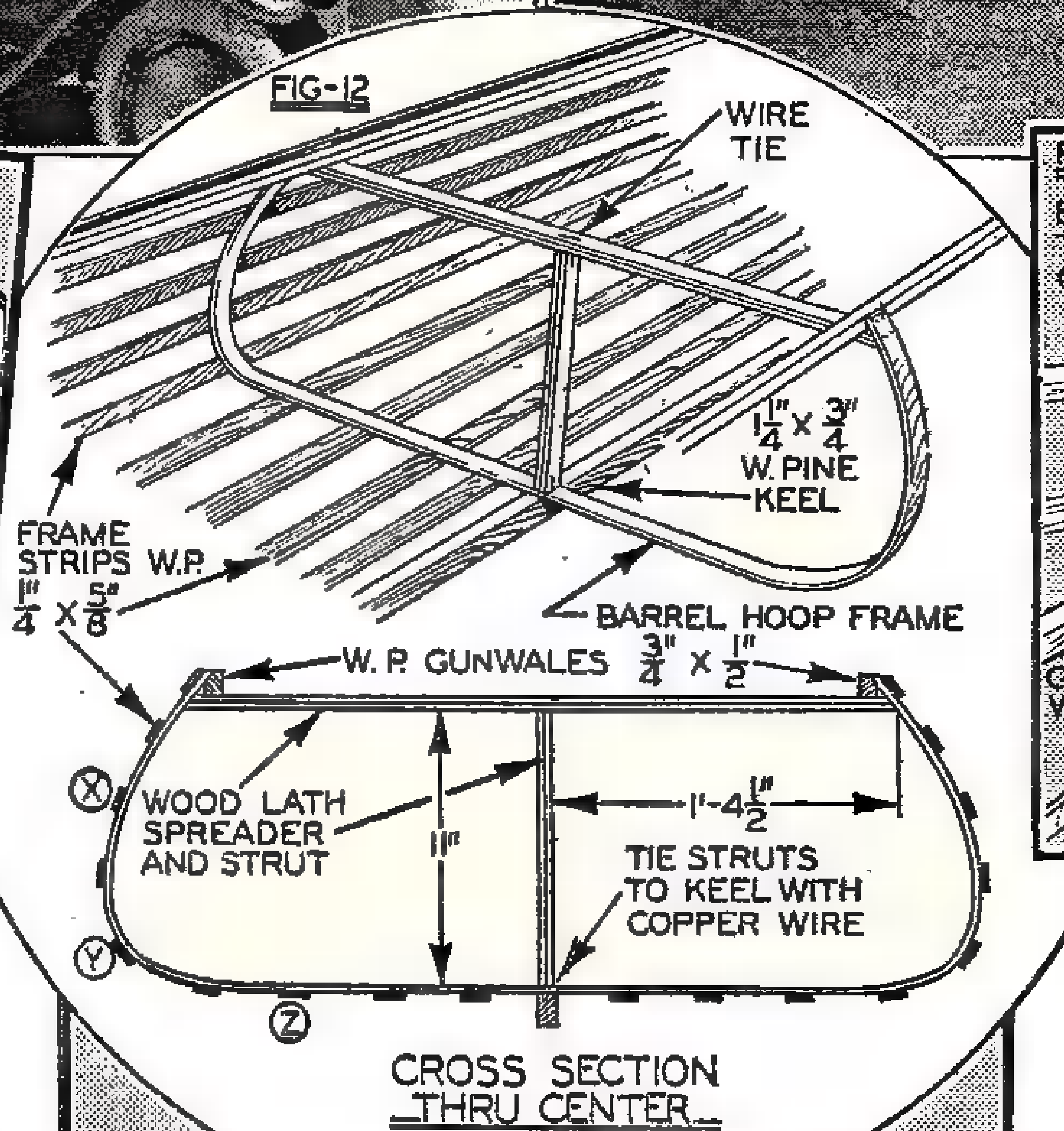


FIG-12
WIRE TIE
1¼" x ¾" W. PINE KEEL
FRAME STRIPS W.P. ¼" x ⅝"
BARREL HOOP FRAME
W. P. GUNWALES ¾" x ½"
WOOD LATH SPREADER AND STRUT
11"
1'-4½"
TIE STRUTS TO KEEL WITH COPPER WIRE
X
Y
Z
CROSS SECTION THRU CENTER
FIG-13

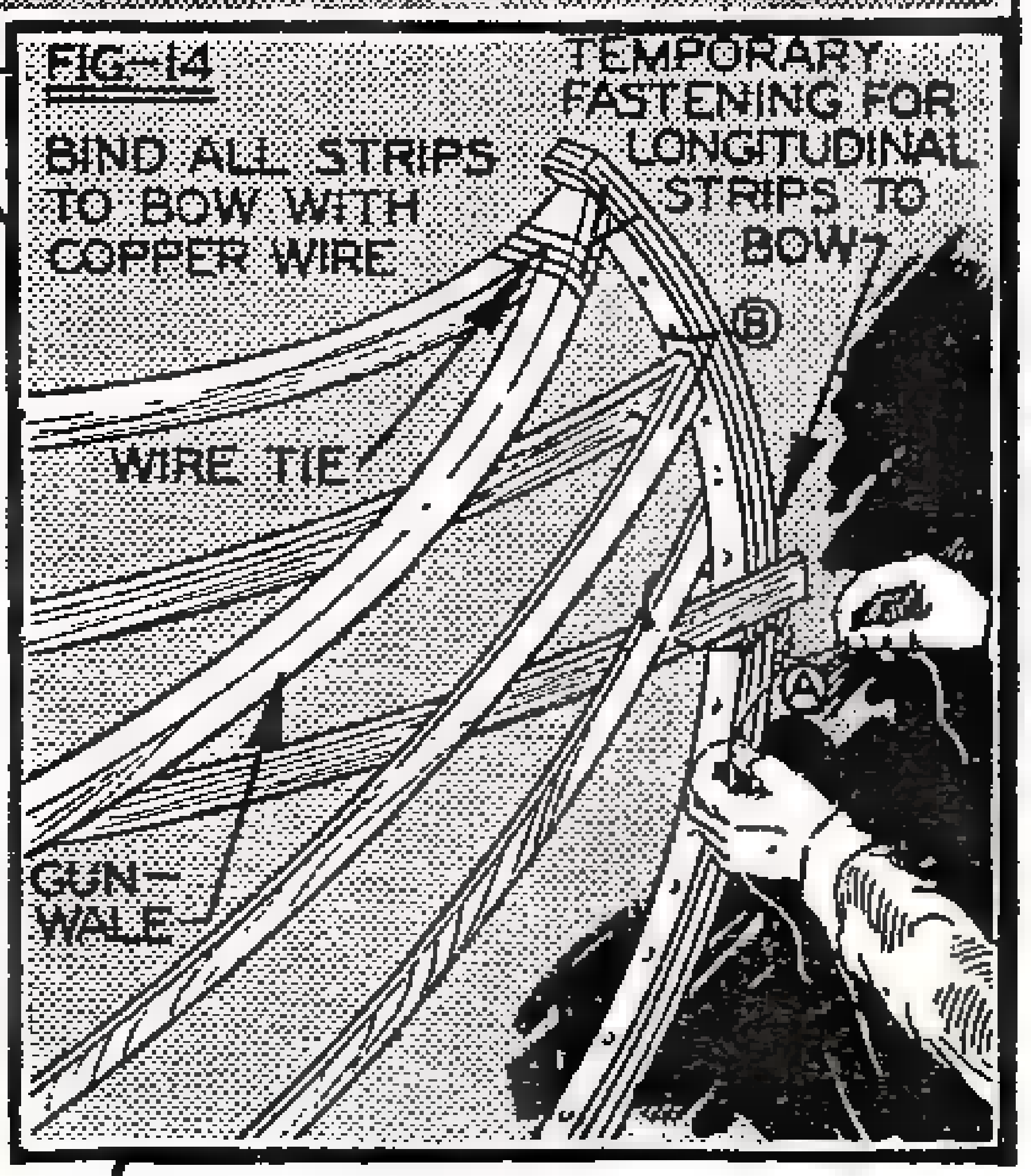
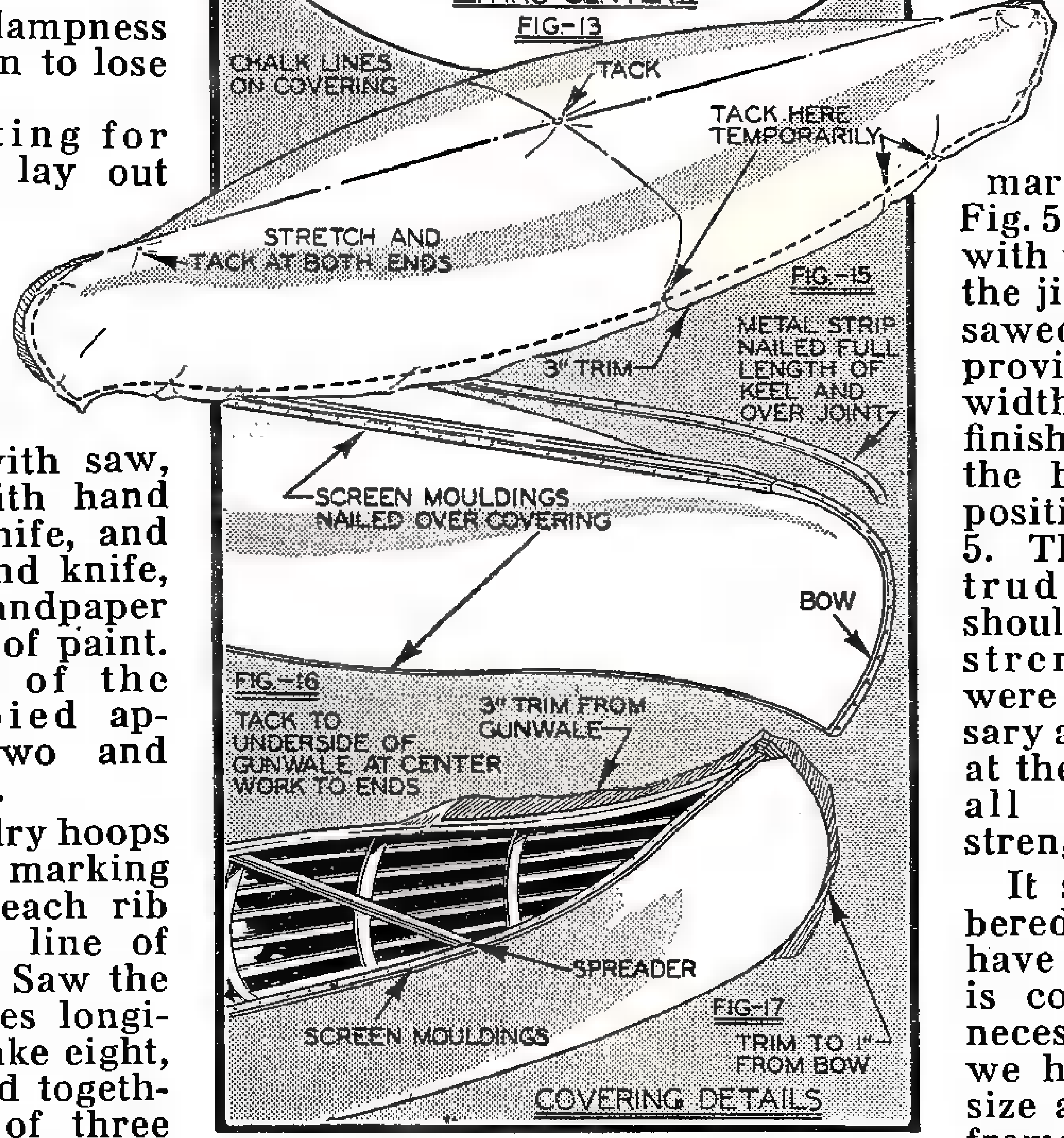


FIG-14
BIND ALL STRIPS TO BOW WITH COPPER WIRE
TEMPORARY FASTENING FOR LONGITUDINAL STRIPS TO BOW
B
WIRE TIE
A
GUN-WALE

The strips or rib bands are bound together temporarily with copper wire at the bow until the ribs are in. At left is shown the center section.



CHALK LINES ON COVERING
TACK
TACK HERE TEMPORARILY
STRETCH AND TACK AT BOTH ENDS
FIG-15
METAL STRIP NAILED FULL LENGTH OF KEEL AND OVER JOINT
3" TRIM
SCREEN MOULDINGS NAILED OVER COVERING
BOW
FIG-16
TACK TO UNDERSIDE OF GUNWALE AT CENTER WORK TO ENDS
3" TRIM FROM GUNWALE
SPREADER
SCREEN MOULDINGS
FIG-17
TRIM TO 1" FROM BOW
COVERING DETAILS

Working from the center at the keel the canvas is tacked down at the edges and stretched with a pair of pliers as it is nailed. One works towards the ends. Mouldings are then put on over the seams and the tacks before final finishing. Marine glue such as Jeffery's "C" quality or Casco casein glue will form good adhesives for the canvas.

long, as the dampness may cause them to lose their curve.

While waiting for parts to dry, lay out the paddle as indicated in Fig. 4, using straight, knotless white pine "shop lumber." Cut out roughly with saw, hew down with hand ax or draw knife, and finish with hand knife, hand plane, sandpaper and two coats of paint. The making of the paddle occupied approximately two and one-half hours.

Remove the dry hoops from the jig, marking the center of each rib by the center line of the jig layout. Saw the four bow pieces longitudinally to make eight, six to be nailed together in groups of three and trimmed as indicated in Fig. 3. The other two pieces are to be screwed over the bows outside the covering as shown in Fig. 11.

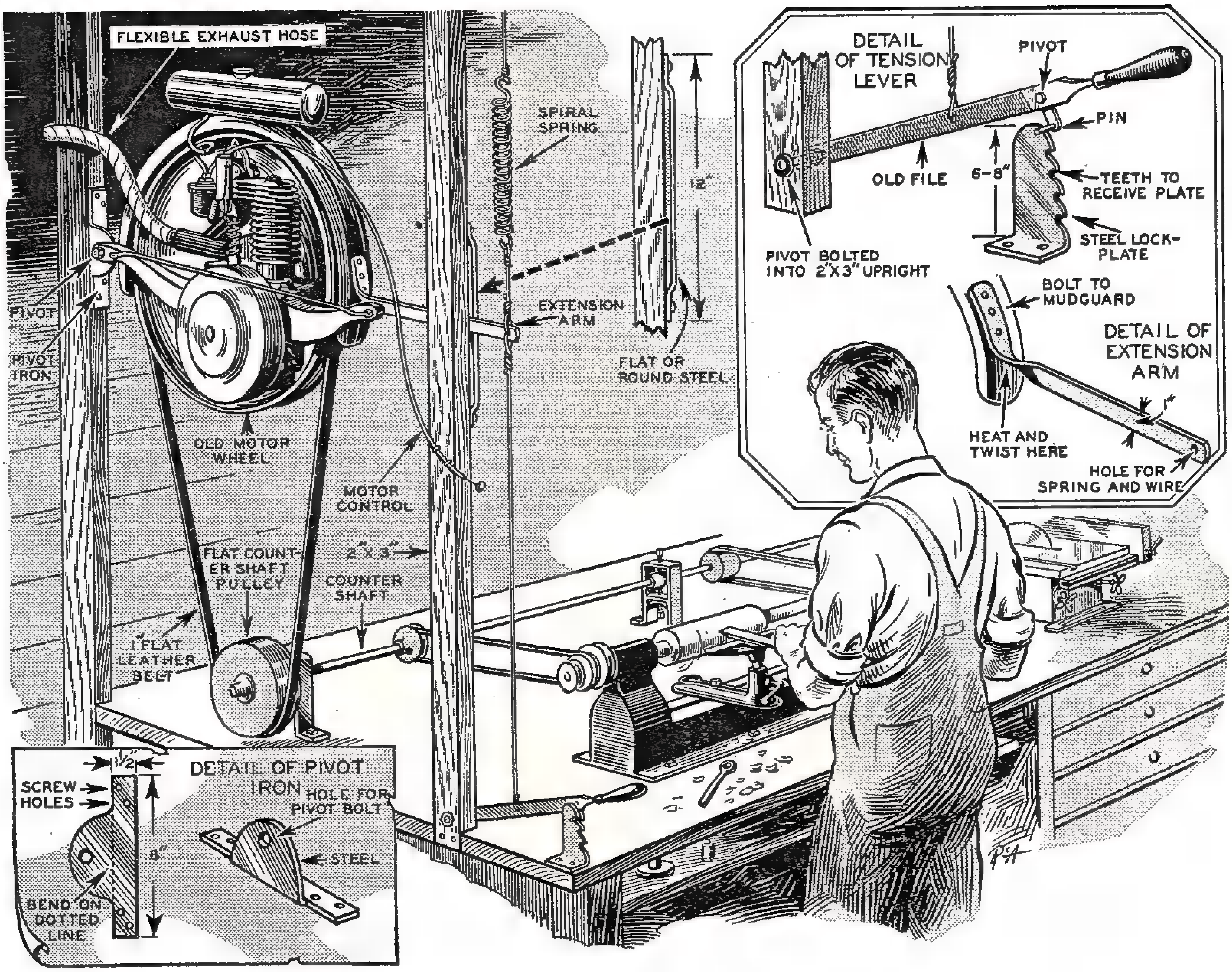
Nail the ribs to the keel with two 1-in. nails at the points marked by letters in Fig. 5 which correspond with the form letters on the jig, Fig. 1. Rib D is sawed longitudinally to provide two ribs of half width. With two 2-in. finishing nails, fasten the bow-pieces in the positions shown in Fig. 5. The nails will protrude slightly and should be bent over to strengthen. Screws were not found necessary as subsequent work at these joints provides all the additional strength required.

It should be remembered that we want to have as light a craft as is consistent with the necessary strength, and we have cut down the size and number of the frame members as much as is advisable.

Fig. 7 shows the method used in fastening the gunwales to the

(Cont'd on page 130)

Motor Wheel Makes Shop Power Plant


FLEXIBLE EXHAUST HOSE
SPIRAL SPRING
12"
DETAIL OF TENSION LEVER
PIVOT
PIN
OLD FILE
6-8"
TEETH TO RECEIVE PLATE
STEEL LOCK-PLATE
PIVOT BOLTED INTO 2"X3" UPRIGHT
BOLT TO MUDGUARD
DETAIL OF EXTENSION ARM
1"
HEAT AND TWIST HERE
HOLE FOR SPRING AND WIRE
EXTENSION ARM
FLAT OR ROUND STEEL
PIVOT
PIVOT IRON
OLD MOTOR WHEEL
MOTOR CONTROL
2"X3"
FLAT COUNTER SHAFT PULLEY
COUNTER SHAFT
1" FLAT LEATHER BELT
DETAIL OF PIVOT IRON
1½"
SCREW HOLES
HOLE FOR PIVOT BOLT
8"
STEEL
BEND ON DOTTED LINE
PSA

Motor wheel attaches to wall by means of a pivot iron as shown. Throwing down tension lever disengages belt, allowing motor to idle, while letting up on lever sets machine to turning. Fan on motor shaft will prevent overheating.

HOME woodworkers, ahoy! Here's a cheap power plant for operating your lathe, jig-saw, bench-grinder, or what have you.

You remember those little motor wheels that used to chug along astern a bike. Well, you can easily pick up one at most any machine "bone yard" for a dollar or two.

Here's how to put it into operation. First consult the drawing above. You'll notice that the pivot on the frame is secured to a pivot iron on studding in the workshop wall. Also you'll notice that there is an extension arm bolted to the fender. To a hole in the end of this is attached a spiral spring and a wire leading down to the tension lever with which you start or stop the machines.

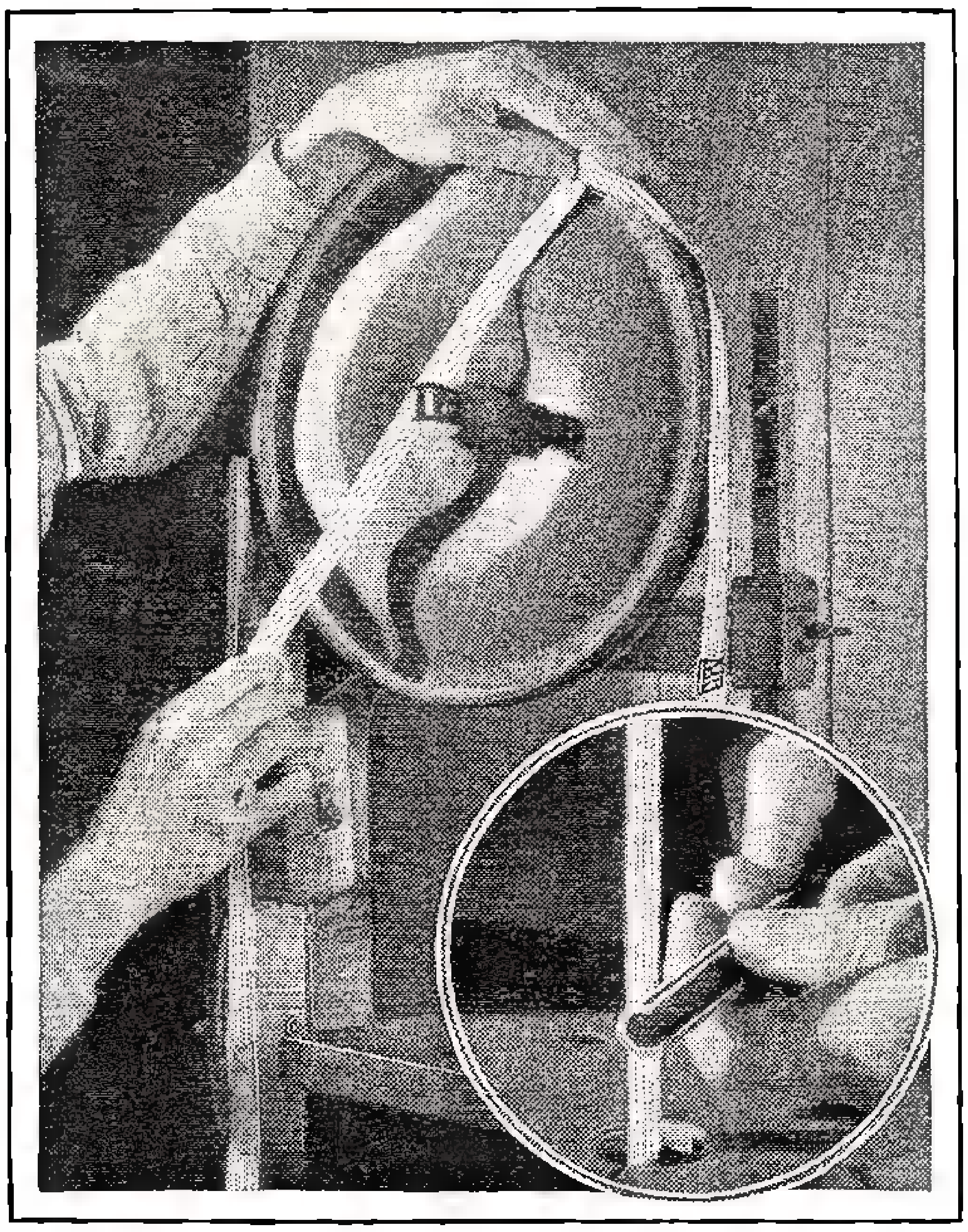
This tension arm is held down to any position by catching the pin in the teeth of a vertical plate under it. When the tension lever is raised the overhead spring pulls the motor up and thus causes tension on the belt. If you want to stop the machines without stopping the motor, pull down the lever until the belt is loosened. This allows the motor to idle.

To start all you need to do is set the controls, turn on the spark, and pull down on the belt, which then is in tension. As soon as the motor starts adjust the speed and you are ready for an hour or two of work at the slight expense of a pint or two of gasoline.

Anti-slump for Music Sheets

MUSIC sheets that won't slip on a piano may be made by running a length of No. 20 gauge copper wire along the edges and sealing it firmly in place with adhesive paper tape. Such treatment gives the music enough backbone to stand erect throughout the concert.

How to Convert Your Band Saw Into Polishing Machine



Twilled tape is fitted over discs in place of regular band saw as illustrated in photo above. Articles to be polished are held against the tape as demonstrated in the inset.

YOU can convert your band saw into a useful polishing machine by making a "blade" out of five cents worth of twilled tape, ½ to ⅝ in. wide. Cut the tape at least ½ in. longer than necessary for passing around the wheels, to allow for splicing. You can sew or glue the joint together.

Remove the regular band saw blade, guides and guards, and put the tape belt into place, tightening the tension moderately. Hold the article to be polished against the moving tape. Rouge or other polishing material can be used.

The tape is particularly useful for buffing long, slender objects such as rods, pencils, candlesticks, etc. You may find it advantageous to place some kind of support behind the tape, so that you can employ greater pressure. This support should have smooth or rotating guides.

You can purchase ⅝-in. twilled tape at nearly all novelty or drygoods stores, six yards costing ten cents. For heavier work, you can use a woven cotton belt such as the kind sold for driving shop machinery. Endless belts of this kind can be obtained.

When the job is finished the tape can be stored away and the saw returned to its position. MODERN MECHANIX AND INVENTIONS Editors will be glad to furnish you with necessary purchasing data.

Two Simple Kinks for Developing Enlargements Too Big to Fit the Trays

OFTEN it is desired to make enlargements of a size far in excess of the size of the largest trays available. Development in this case may be carried out in two ways without the necessity of trays.

By the first method, a quantity of pure glycerine is added to the developer, equal in volume to one-third of the amount of developer used. The paper, before exposure, should be soaked in this solution for two minutes.

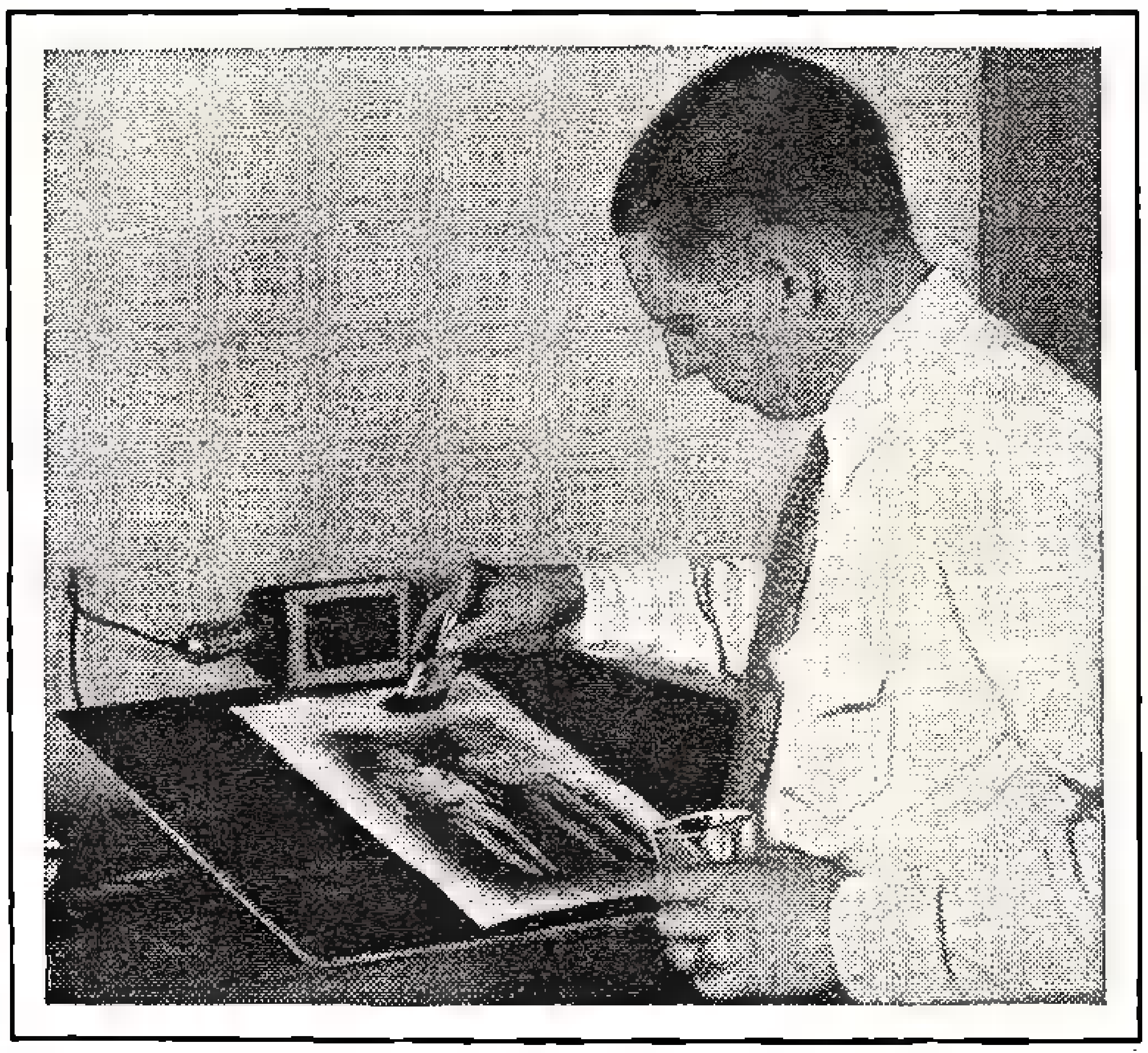
The enlarging easel is then covered with a piece of oil cloth, and the sensitized paper then placed on this and the exposure made. The wet paper will remain in contact with the easel without fastening it in any other manner than just laying it on flat.

Exposure and development will then proceed together and the process can be watched until the desired density is obtained, when exposure should be stopped, the print thoroughly rinsed in water, and placed in the fixing bath. It is better to expose slowly when using this method so that the development will be able to keep up with the exposure.

Considerable control over the print is obtained in this manner; development may be hurried or retarded in spots by brushing on more developer or water gently with a soft brush.

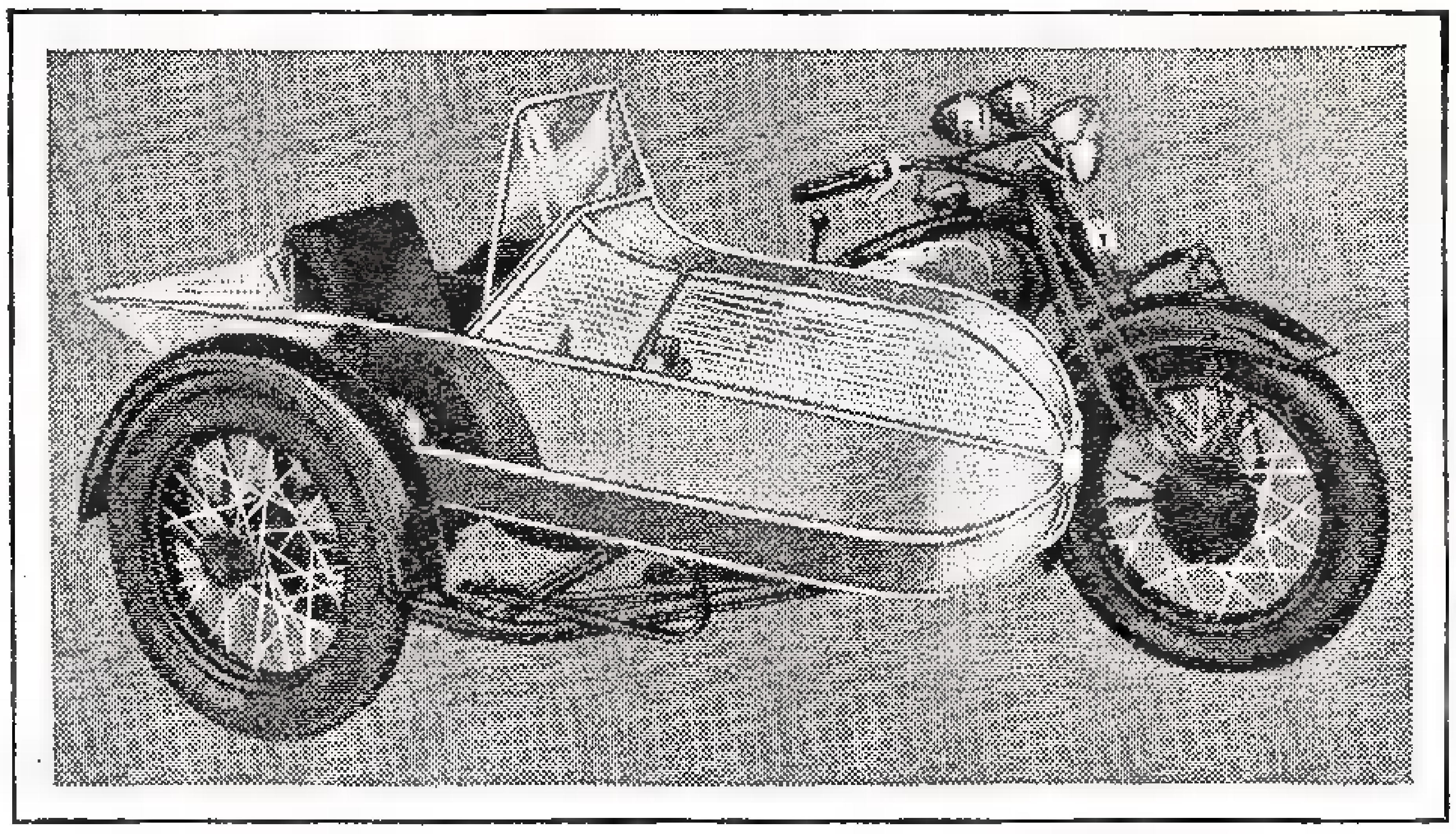
By the second method, prints are made in the usual manner and after exposure are laid out on a slightly tilted board covered with oil cloth. They are then thoroughly soaked with water, applied with a brush. When the soaking is completed the developer is brushed on swiftly and evenly with a soft brush, first using up and down strokes and then cross strokes.

Control over development is obtained in the same manner as mentioned in the first method. This makes a very economical way of developing, as the amount of developer required to make a large print is exceedingly small. It can be recovered if desired, and used again, though this is hardly worth while.

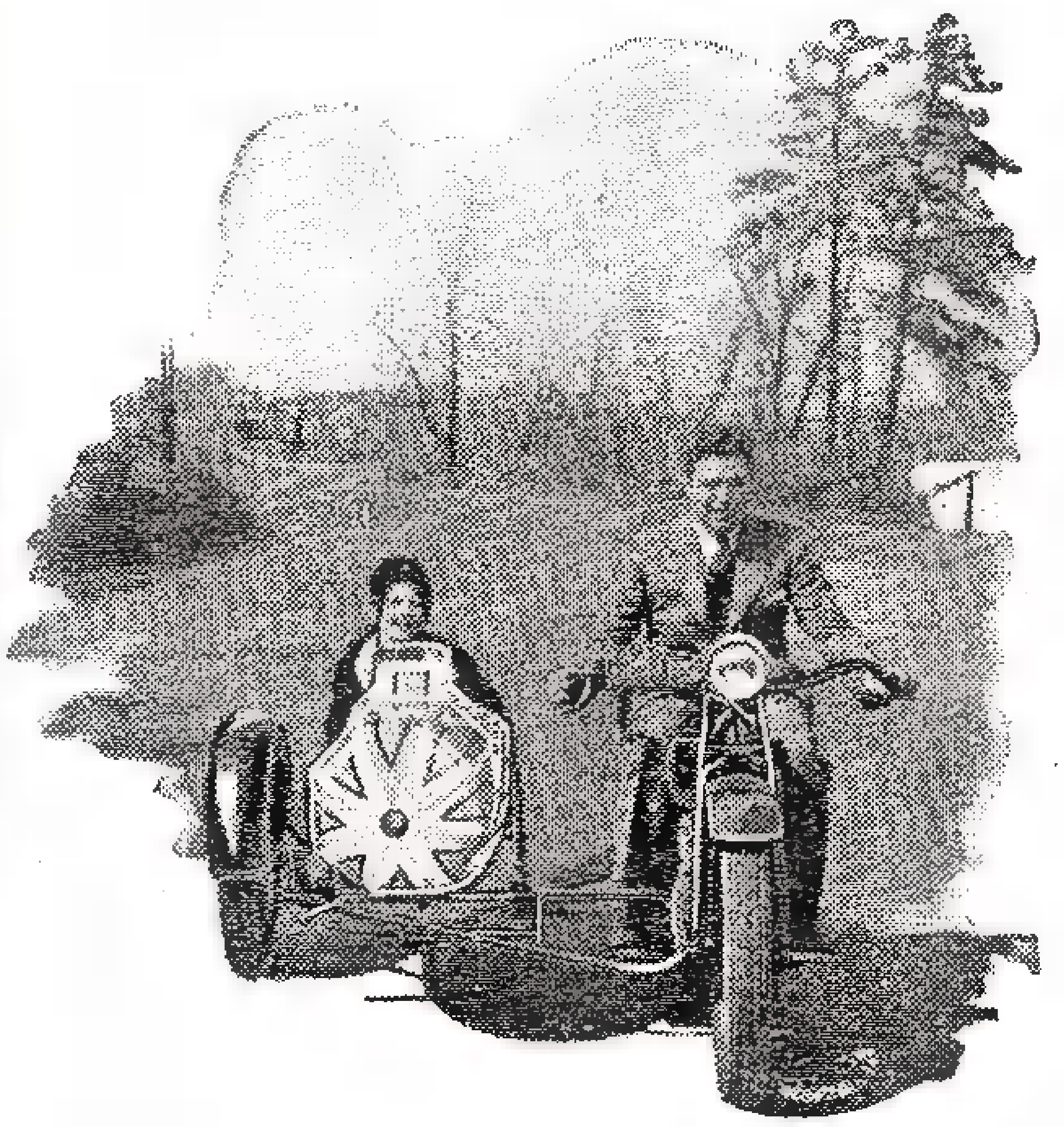


Brush on developer using swift vertical, horizontal strokes.

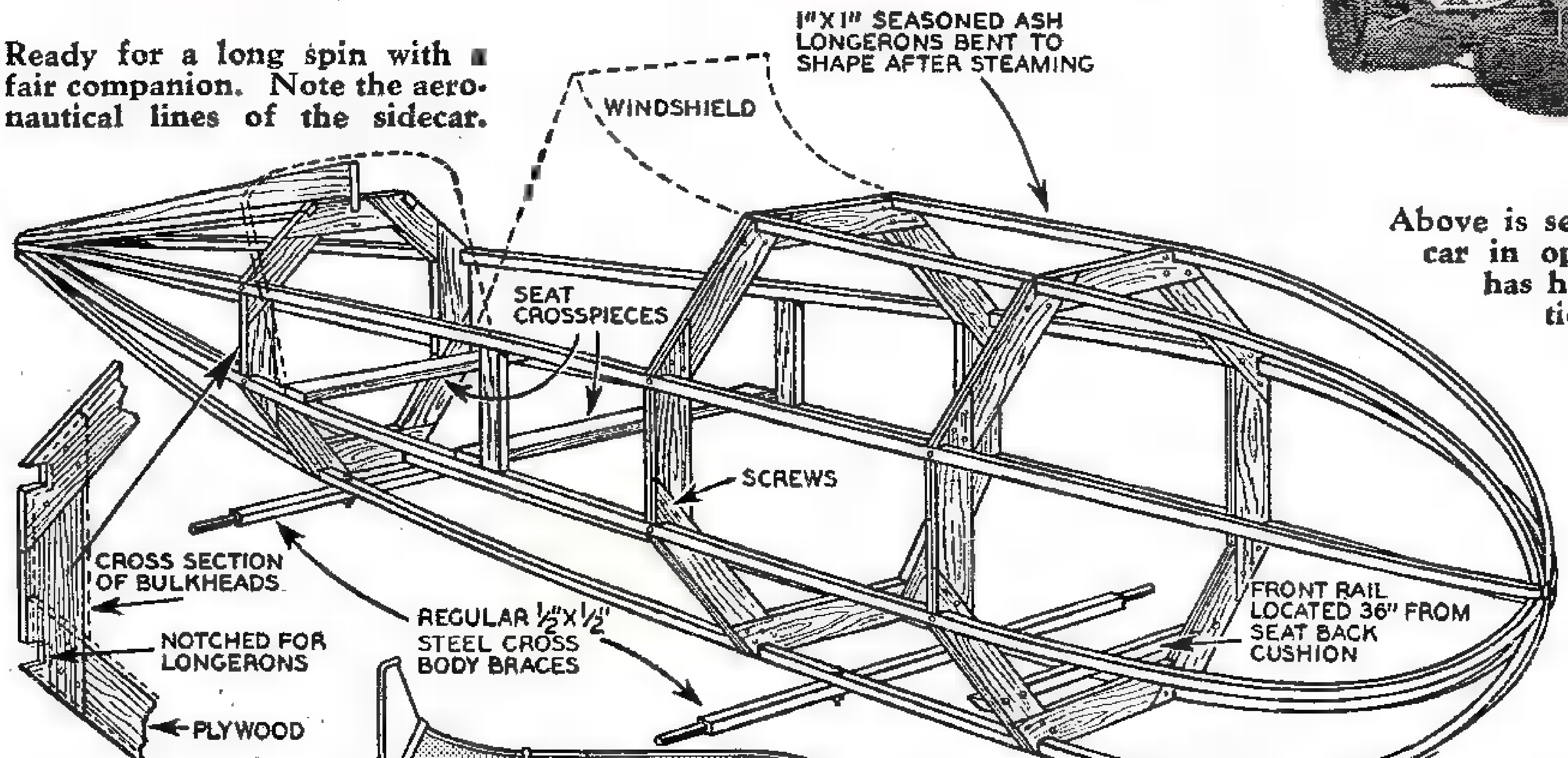
Sports Model SIDECAR Is Easy to Build

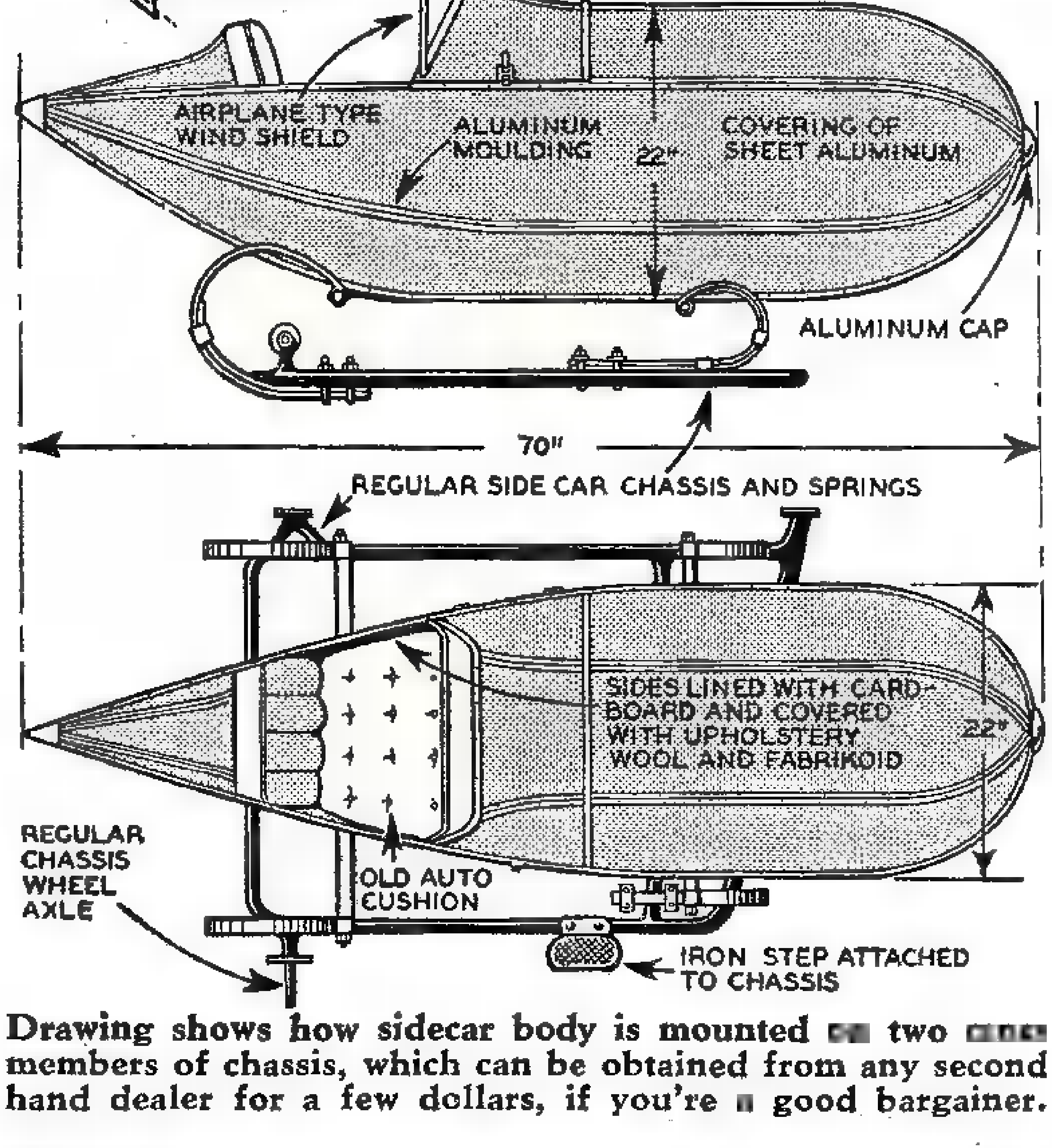


Ready for a long spin with a fair companion. Note the aeronautical lines of the sidecar.



Above is seen the completed sidecar in operation. This builder has his own ideas on decoration, but you can apply yours to your own job. At left — framework of the body. Aluminum is tacked over the longerons, and seams are covered with moulding. It's advisable to brace the interior strongly with wire and turnbuckles. Windshield may be thin celluloid, framed with either metal or wood.


1"X1" SEASONED ASH LONGERONS BENT TO SHAPE AFTER STEAMING
WINDSHIELD
SEAT CROSSPIECES
SCREWS
CROSS SECTION OF BULKHEADS
NOTCHED FOR LONGERONS
PLYWOOD
REGULAR ½"x½" STEEL CROSS BODY BRACES
FRONT RAIL LOCATED 36" FROM SEAT BACK CUSHION


AIRPLANE TYPE WIND SHIELD
ALUMINUM MOULDING
22"
COVERING OF SHEET ALUMINUM
ALUMINUM CAP
70"
REGULAR SIDE CAR CHASSIS AND SPRINGS
SIDES LINED WITH CARDBOARD AND COVERED WITH UPHOLSTERY WOOL AND FABRIKOID
22"
REGULAR CHASSIS WHEEL AXLE
OLD AUTO CUSHION
IRON STEP ATTACHED TO CHASSIS

Drawing shows how sidecar body is mounted [illegible] two [illegible] members of chassis, which can be obtained from any second hand dealer for a few dollars, if you're a good bargainer.

THERE are times when the motorcyclist wishes to have someone to share the joys of his traveling with him, and there is no better way of attracting such companionship than by owning this handsome polished aluminum sports sidecar.

Very few tools are required in its construction, and the materials will not run to a very high cost.

It is not advisable for the rider to attempt to build the sidecar chassis. If you own a standard make of motorcycle, such as an Indian 45 or a Harley 45, you can probably buy a second hand chassis from your nearest motorcycle dealer for a few dollars.

It's advisable to select a chassis which has the mudguard attached to the chassis itself and, incidentally, make sure that you get all the fittings.

The body of this sports sidecar is built with bulkheads of three-ply veneer, while the longerons are of seasoned ash, properly bent by steaming and bending on a template or form constructed for the purpose.

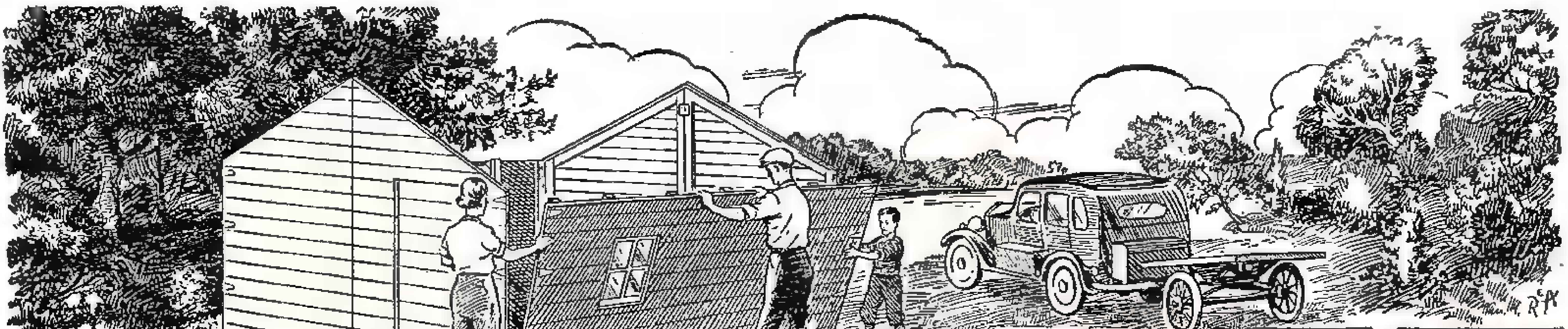
Fasten the body together with screws wherever possible, and to add strength put wires and turnbuckles across where necessary. The more bracing, the better.

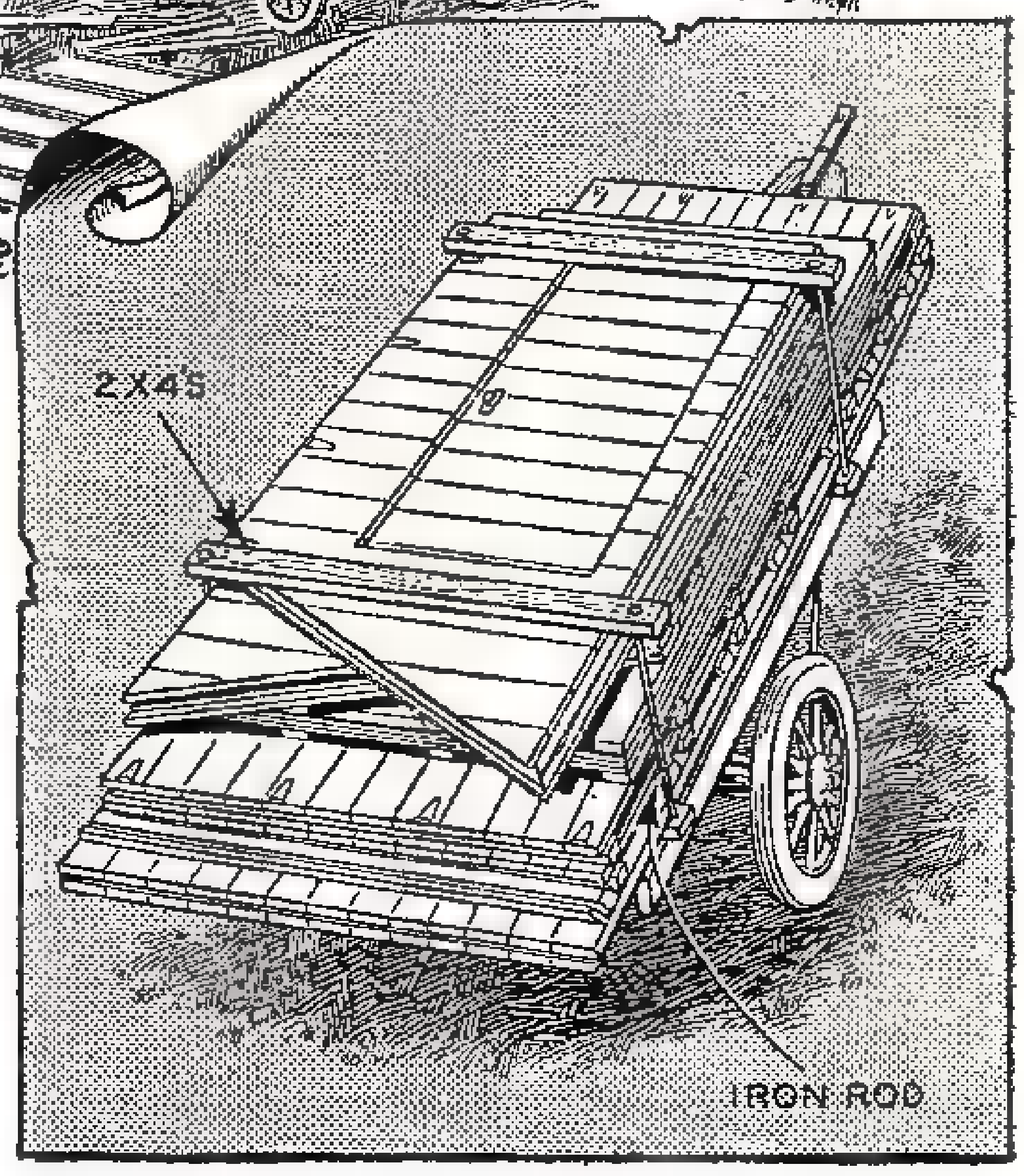
As soon as the frame has been completely assembled, it will be ready for covering with sheet aluminum. Fasten the aluminum with brass round-headed nails with fairly large heads, placed one inch apart. After one panel has been tacked on, be sure and trim it very carefully along the edges before tacking the next panel.

If you want a really neat appearing job, obtain from an automobile body shop some fine aluminum moulding strips and fasten them along the seams. A polished aluminum cap, obtainable at any hardware store, makes a neat tip for the nose.

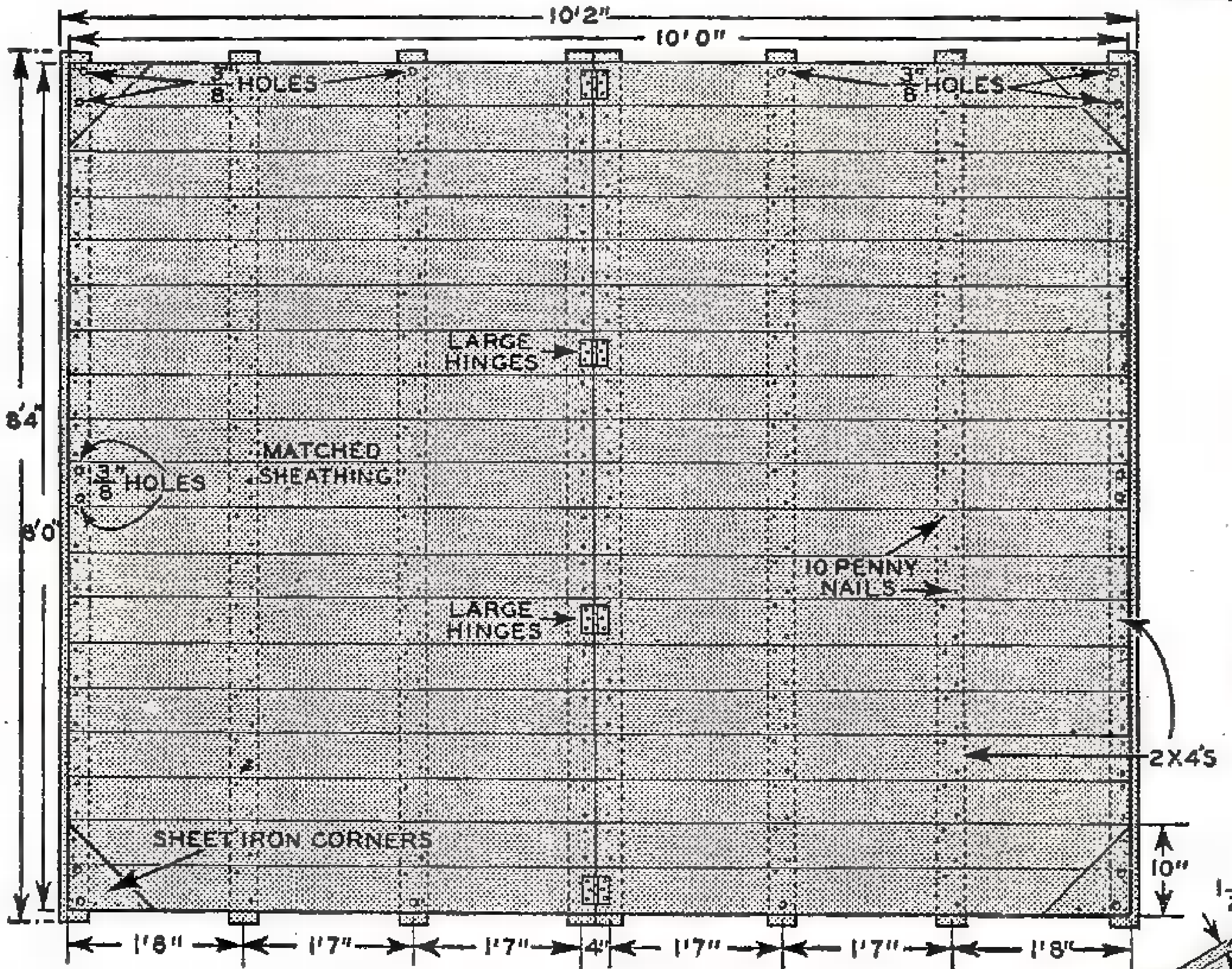
(Continued on page 134)

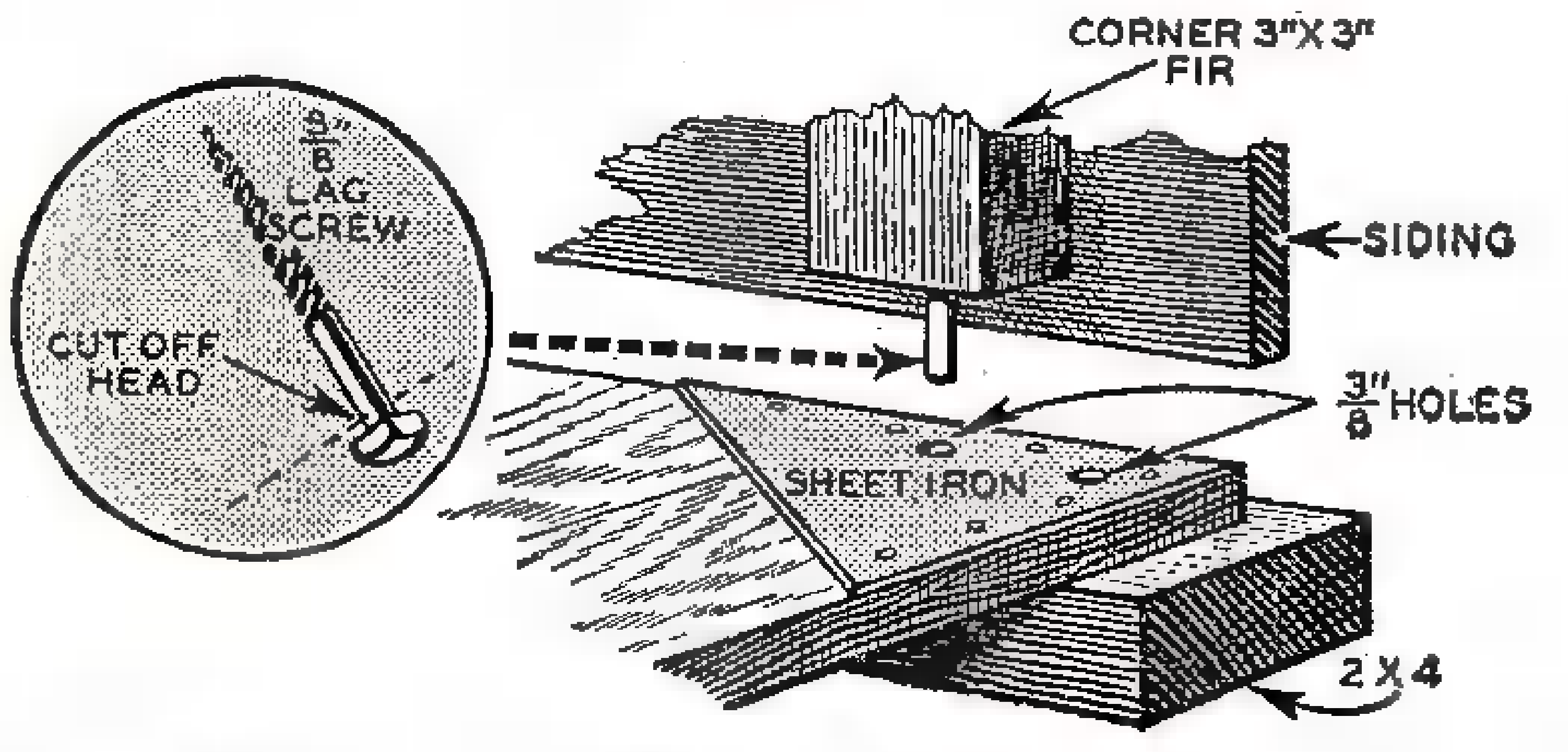
Trailer Carries This Portable



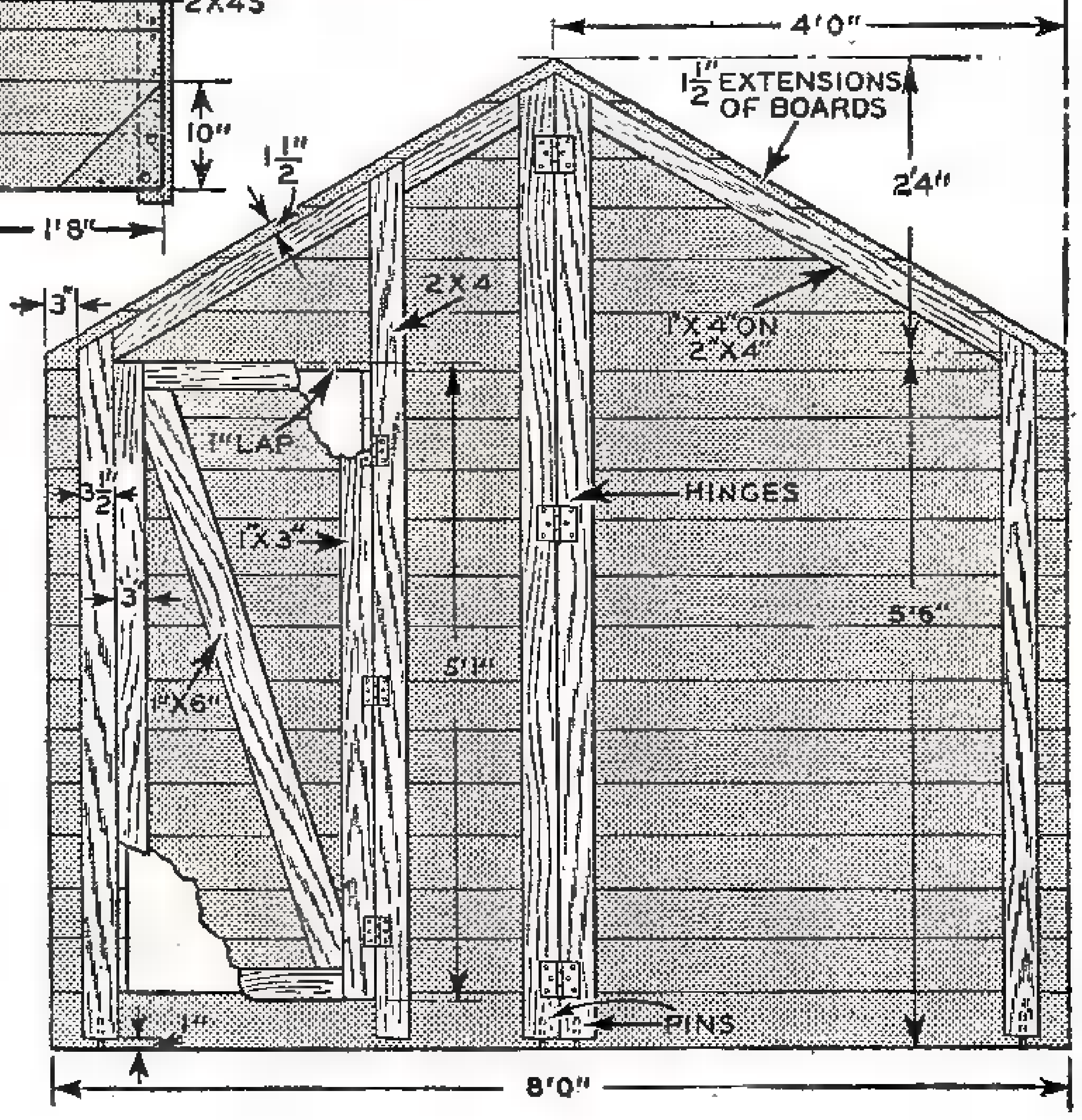

2X4'S
IRON ROD

Units of house are transported on trailer to camp site. 2x4's underneath and on top are joined by iron rods to clamp the units into an easily shipped bundle.


10'2"
10'0"
3/8" HOLES
3/8" HOLES
LARGE HINGES
MATCHED SHEATHING
3/8" HOLES
8'4"
8'0"
10 PENNY NAILS
LARGE HINGES
2X4'S
SHEET IRON CORNERS
10"
1'8"
1'7"
1'7"
4"
1'7"
1'7"
1'8"


3/8" LAG SCREW
CUT OFF HEAD
CORNER 3"X3" FIR
SIDING
3/8" HOLES
SHEET IRON
2X4

Assemble elements of floor and side as shown then cut down middle to form two hinged halves. Lag screws in side are set in 3/8 in. holes in floor to hold house in place.


4'0"
1 1/2" EXTENSIONS OF BOARDS
2'4"
1 1/2"
2X4
3"
1"X4" ON 2"X4"
1" LAP
3 1/2"
HINGES
1"X3"
3"
5'11"
5'6"
1"X6"
1"
PINS
8'0"

THIS sturdy cabin has been designed for the fellow who wants to go somewhere and take a good shack along with him. It has the advantage that it can be slung on a trailer and taken wherever you can drive your car.

Once on the camp site, whether for 24 hours or a month, you flip the sections together and there before you stands a cabin you'll be proud of.

Beating rains can't bother; the floor won't sag, and with windows on each side you can regulate the ventilation to suit. The floor space is ample for 2 double beds, chairs, a small table—even a topsy stove for chilly weather. Let's look into the business of building it.

Briefly, this cabin is divided into 6 units—the roof, the two sides, the two ends and the floor. The floor, roof and ends are divided and hinged along the middle so that they may be folded to half their open area. A unique detail of locking the corners is by means of hinges screwed to the adjoining surfaces.

To take the cabin apart, the center hinge

Knock-down Cabin to Camp

pins are removed, thus making this step simple and effective. Pins made from lag screws with the heads sawed off after being placed, extend an inch below certain studding and the corner posts. These protruding pins fit into holes in the floor, locking the floor and side walls.

To insure a tight fit at the ridge of the roof, a strip of canvas is nailed down under the hinges and over the roofing (if roofing is used) and this coated with hot asphalt.

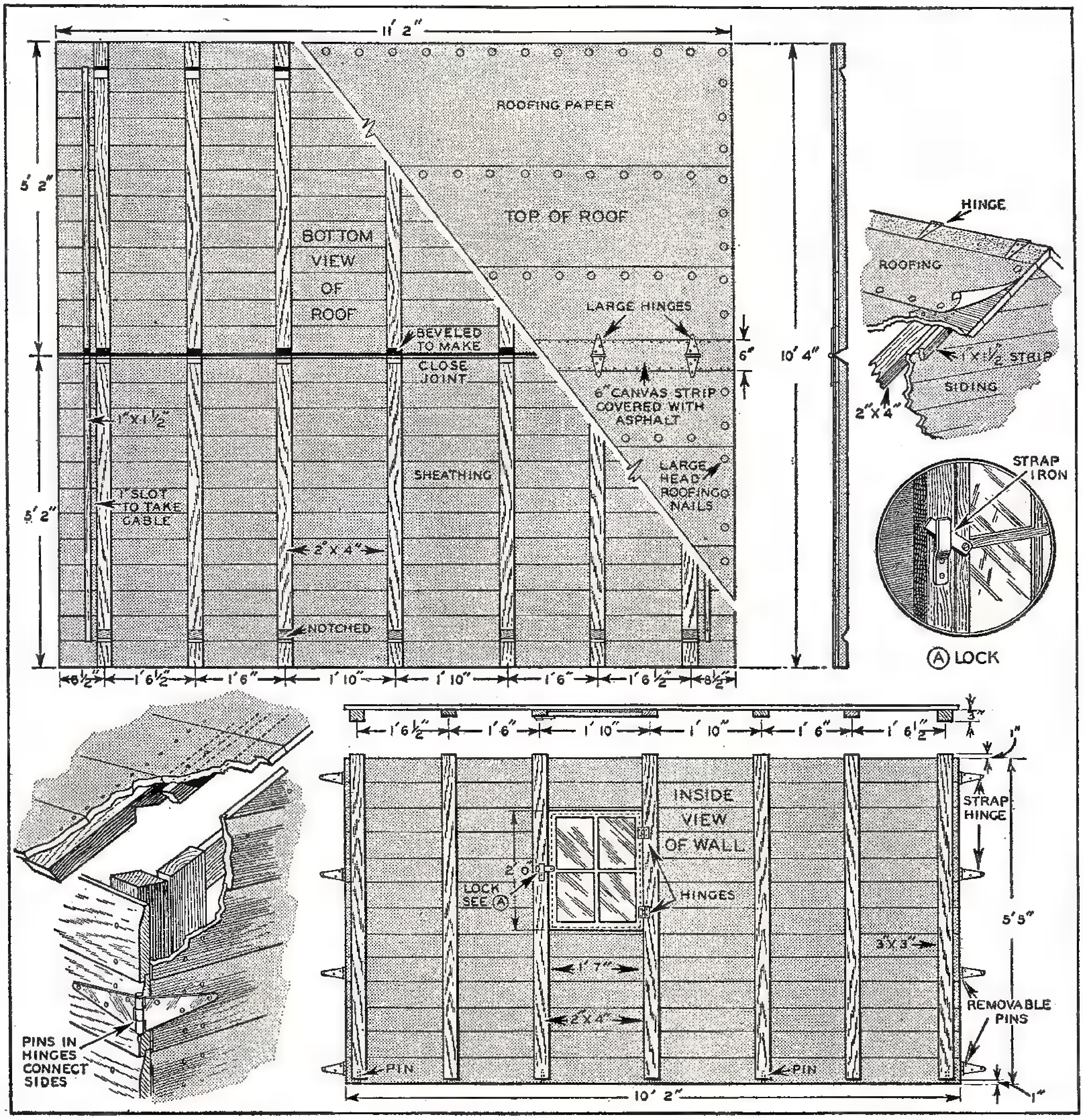
You'll find it advisable when making the floor to lay out your materials, then nail them together. When this is done, cut the piece down the center and apply the hinges as illustrated in an accompanying drawing.

Each side is alike. For one, lay the 2 by 4 in. pieces which are 5 feet, 5 inches long on a smooth surface and after spacing them, nail on the drop siding. Note that the siding extends 1 inch past each corner post. These posts are 4 by 4 fir planed down to 3 inches square for less weight.

The most practical way to install the windows is to hinge each sash as shown, cutting the opening through the side 1 inch smaller on each side than the sash.

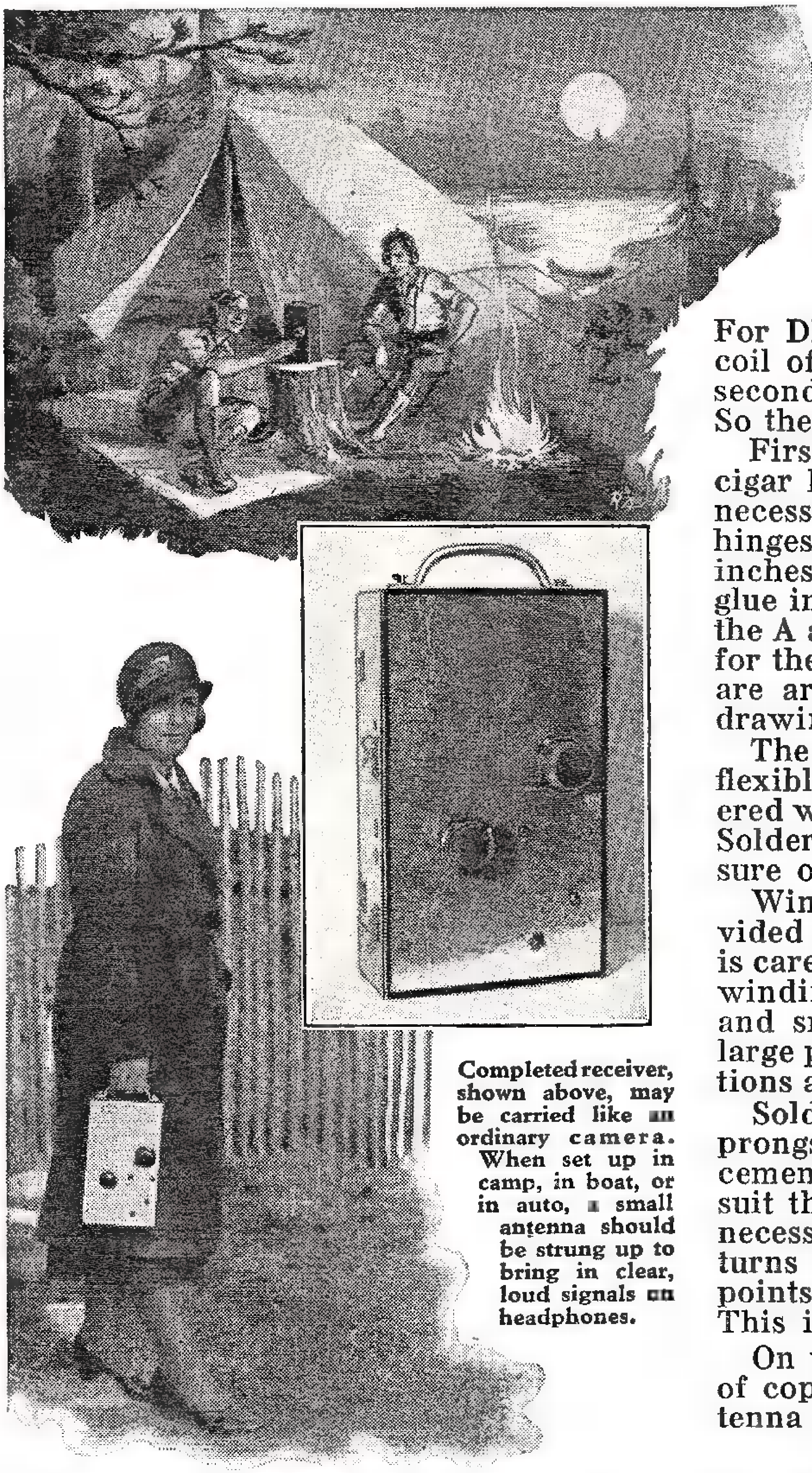
To make each sash fit quite snugly, cut and tack rubber strips (cut from an inner tube) around the four sides of the openings so that when the sash is closed, its four sides will press against the rubber.

(Continued on page 134)


11' 2"
ROOFING PAPER
TOP OF ROOF
BOTTOM VIEW OF ROOF
5' 2"
5' 2"
BEVELED TO MAKE CLOSE JOINT
LARGE HINGES
6"
6" CANVAS STRIP COVERED WITH ASPHALT
LARGE HEAD ROOFING NAILS
SHEATHING
1"x1 1/2"
1" SLOT TO TAKE CABLE
2"x4"
NOTCHED
10' 4"
8 1/2" 1' 6 1/2" 1' 6" 1' 10" 1' 10" 1' 6" 1' 6 1/2" 8 1/2"
HINGE
ROOFING
1"x1 1/2" STRIP
SIDING
2"x4"
STRAP IRON
Ⓐ LOCK
1' 6 1/2" 1' 6" 1' 10" 1' 10" 1' 6" 1' 6 1/2"
3"
1"
INSIDE VIEW OF WALL
STRAP HINGE
2' 0"
LOCK SEE Ⓐ
HINGES
5' 5"
3"x3"
1' 7"
2"x4"
REMOVABLE PINS
PIN
PIN
10' 2"
1"
PINS IN HINGES CONNECT SIDES

Plans for top and sides. Roof has notches in rafters to join with studding in the sides. Join hinges with pin to hold sides.

Midgy Jr.—Complete Vacation



Completed receiver, shown above, may be carried like an ordinary camera. When set up in camp, in boat, or in auto, a small antenna should be strung up to bring in clear, loud signals on headphones.

WELL, radio fans, here's the latest in receivers. Here is a job that weighs less than four pounds including batteries. Lug it around like a camera or carry it in your brief-case, overnight bag, car pocket or even in a large overcoat pocket. It's all the same to Midgy Jr.

For local reception the only accessory is a pair of headphones. For DX work you will, of course, need a coil of flexible wire for an antenna and a second short piece for a ground connection. So there you are.

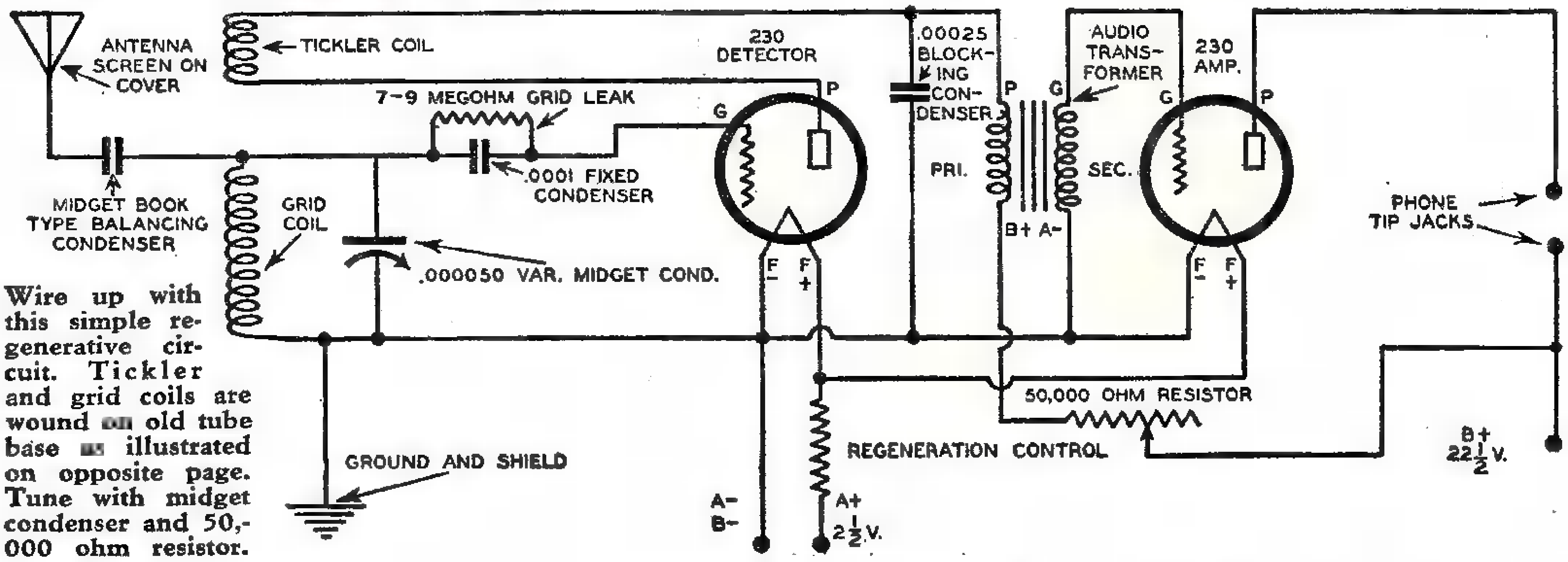
First clean off all tax tags, etc. from a cigar box and sandpaper the wood where necessary. Stand the box on end so the hinges are at the right. Across the box, 2⅞ inches down from the inside of the top, glue in a horizontal partition as shown for the A and B batteries. The lower section is for the receiver parts in the circuit, which are arranged as shown in the photo and drawing.

The parts can be wired with small flexible wire such as No. 22 or No. 24 covered with spaghetti to insure against shorts. Solder all joints where necessary and make sure of all bolted connections.

Winding the coils is a simple matter provided the accompanying winding diagram is carefully followed. Use No. 24 DCC wire, winding on tube bases and using the large and small prongs exactly as shown. The large prongs are for the tickler coil connections and the small prongs for the grid coil.

Solder the ends to windings into the prongs and flood the turns with Duco cement. The number of turns shown will suit the various bands although it may be necessary to add or subtract one or two turns from the grid coils to suit just the points in the bands you may wish to reach. This is a matter of cut and try.

On the inside of the cover fit in a piece of copper window screen wire for an antenna for local use. Connect this with a



ANTENNA SCREEN ON COVER
TICKLER COIL
230 DETECTOR
.00025 BLOCKING CONDENSER
AUDIO TRANSFORMER
230 AMP.
7-9 MEGOHM GRID LEAK
P
G
.0001 FIXED CONDENSER
PRI.
SEC.
B+ A-
MIDGET BOOK TYPE BALANCING CONDENSER
GRID COIL
.000050 VAR. MIDGET COND.
F - F +
PHONE TIP JACKS
50,000 OHM RESISTOR
REGENERATION CONTROL
GROUND AND SHIELD
A- B-
A+ 2½V.
B+ 22½V.

Wire up with this simple regenerative circuit. Tickler and grid coils are wound on old tube base as illustrated on opposite page. Tune with midget condenser and 50,000 ohm resistor.

Receiver in a CIGAR BOX

short piece of flexible wire to the antenna post on the outside of the box through a small hole for the same.

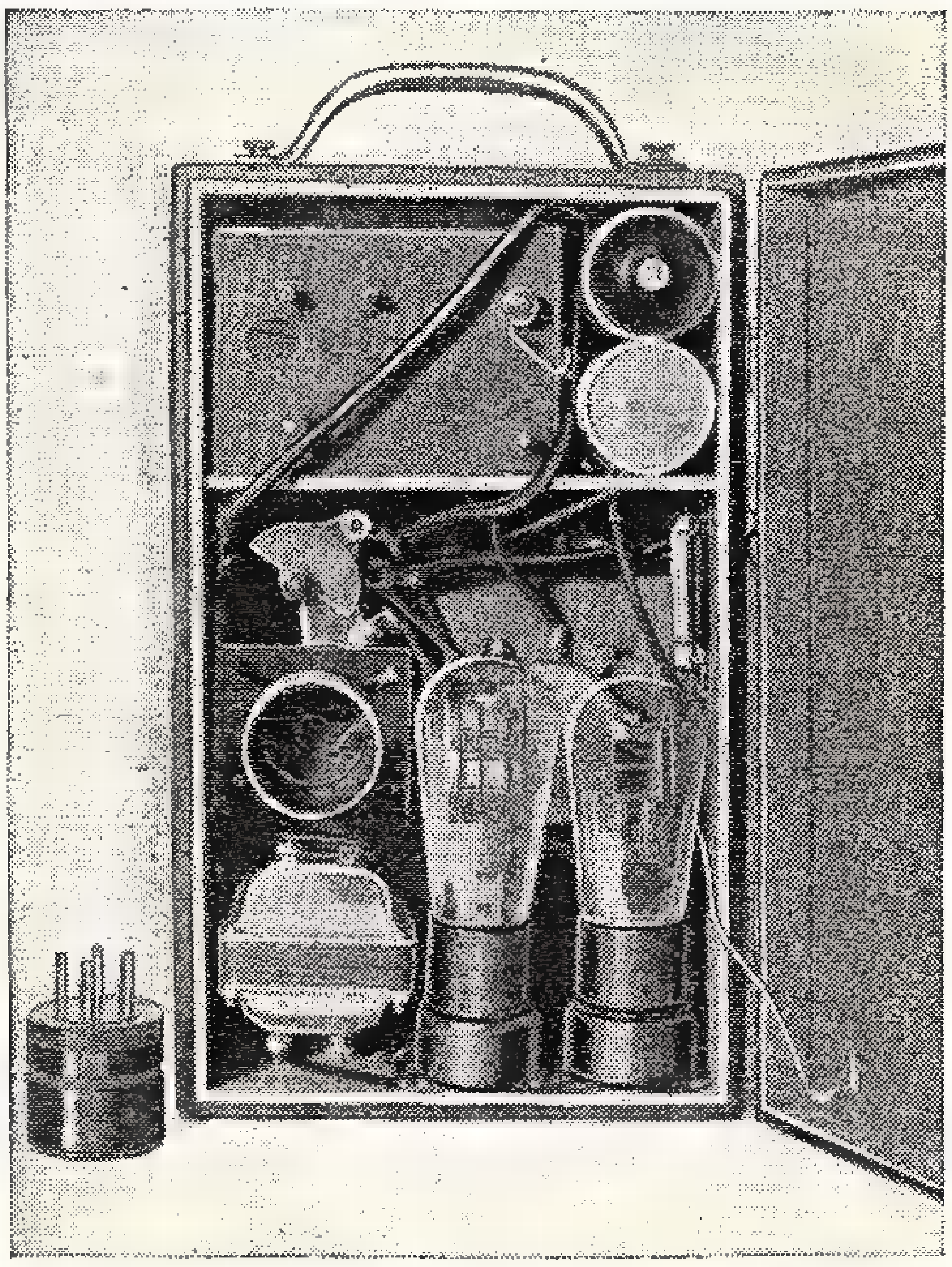
Then shellac the outside of the back, where the tuning condenser and variable resistor shafts come through and press on a sheet of heavy tinfoil to cover the entire surface. Plenty of shellac will make the foil adhere nicely.

Cut around every bolt and screwhead and projecting part so the foil will touch no metal part of the circuit. Then connect one corner of the foil to the ground post. This shielding is necessary to kill hand capacity that would otherwise make tuning very difficult.

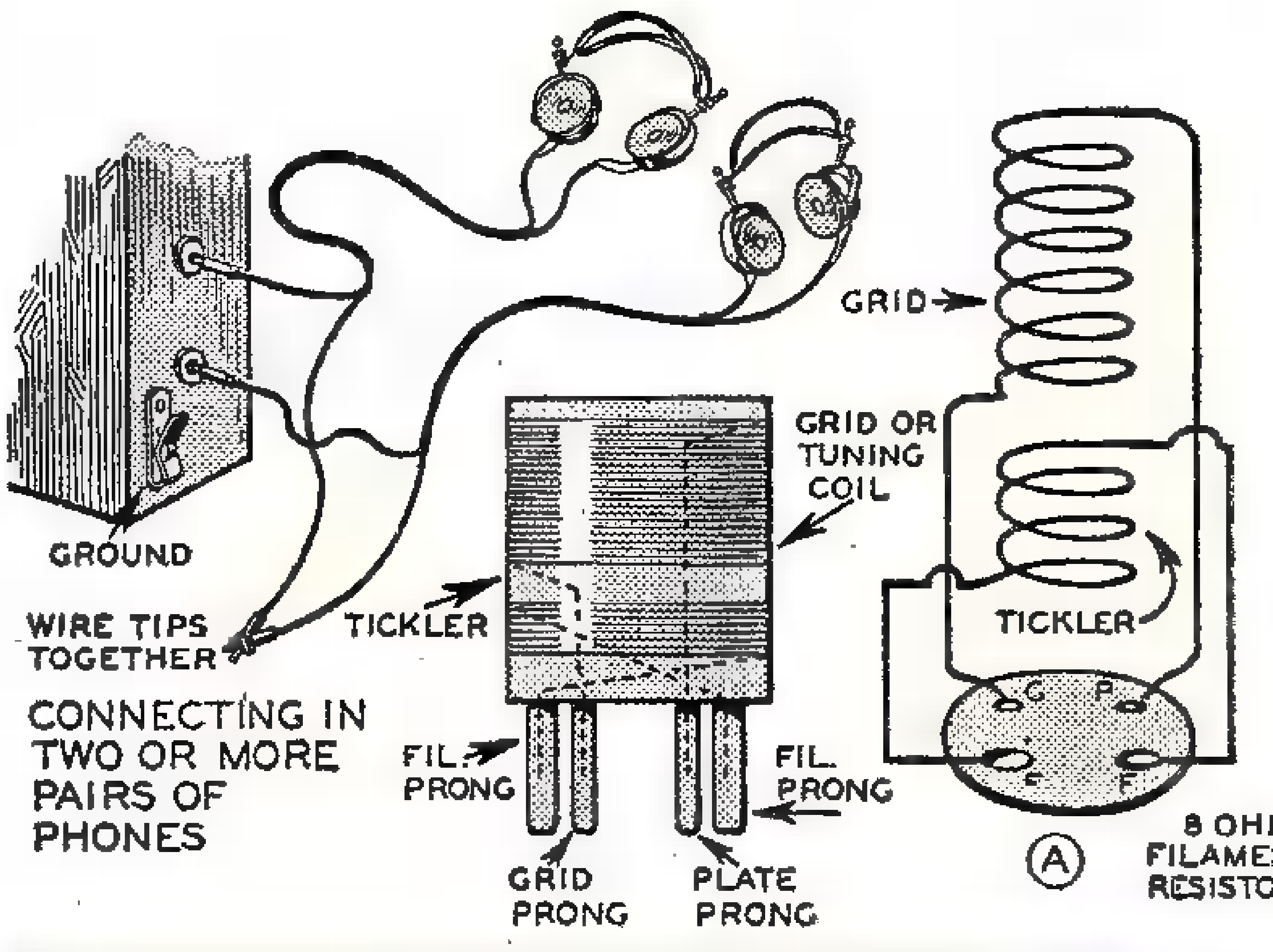
Put the two A battery cells (flashlight) in the case at the right and the 22½-volt B battery at the left. A suitable hold down can be made by jamming a slender stick of wood across the whole battery assembly between the sides. Then connect the A and B wires to the batteries, put in the phones and you are ready to go.

As before stated, if there are no local stations, antenna and ground wires will be needed. For real portability, it is possible to coil up some lengths of fine, flexible wire with clips on one end of each and tuck these inside the cover of the receiver. The extra tuning coils can be carried in the space above the tubes.

(Continued on page 134)



Arrange parts in cigar box as illustrated in this photo.


GROUND
WIRE TIPS TOGETHER
CONNECTING IN TWO OR MORE PAIRS OF PHONES
TICKLER
GRID OR TUNING COIL
FIL. PRONG
FIL. PRONG
GRID PRONG
PLATE PRONG
GRID
TICKLER
G
P
F
F
A

	BAND	WIRE	GRID	TICKLER
THESE WAVE LENGTHS	METERS	NO 24 D.C.C.	TURNS	TURNS
ARE ONLY APPROXIMATE	300-500	"	145	55
AS CONDITION OF PARTS	200-300	"	90	35
AND ASSEMBLY WILL	125-190	"	42	18
GOVERN USE OF COILS—	65-85	"	20	10
TRY ONE AND SEE WHAT	35-45	"	9	7
IT WILL DO-THEN ANY	16-25	"	5	6
DIFFERENCES CAN BE ADJUSTED IN WINDING OTHERS				

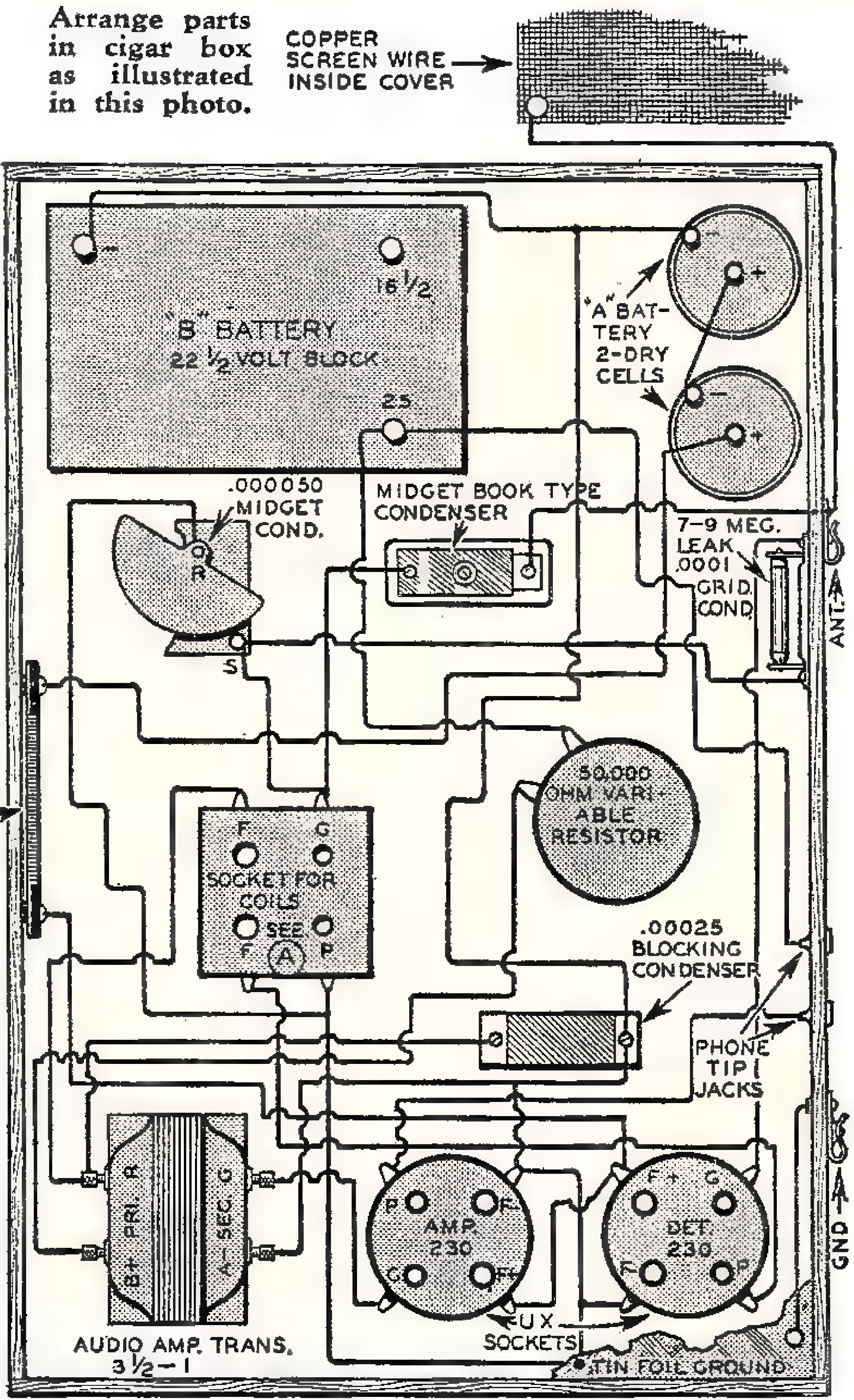
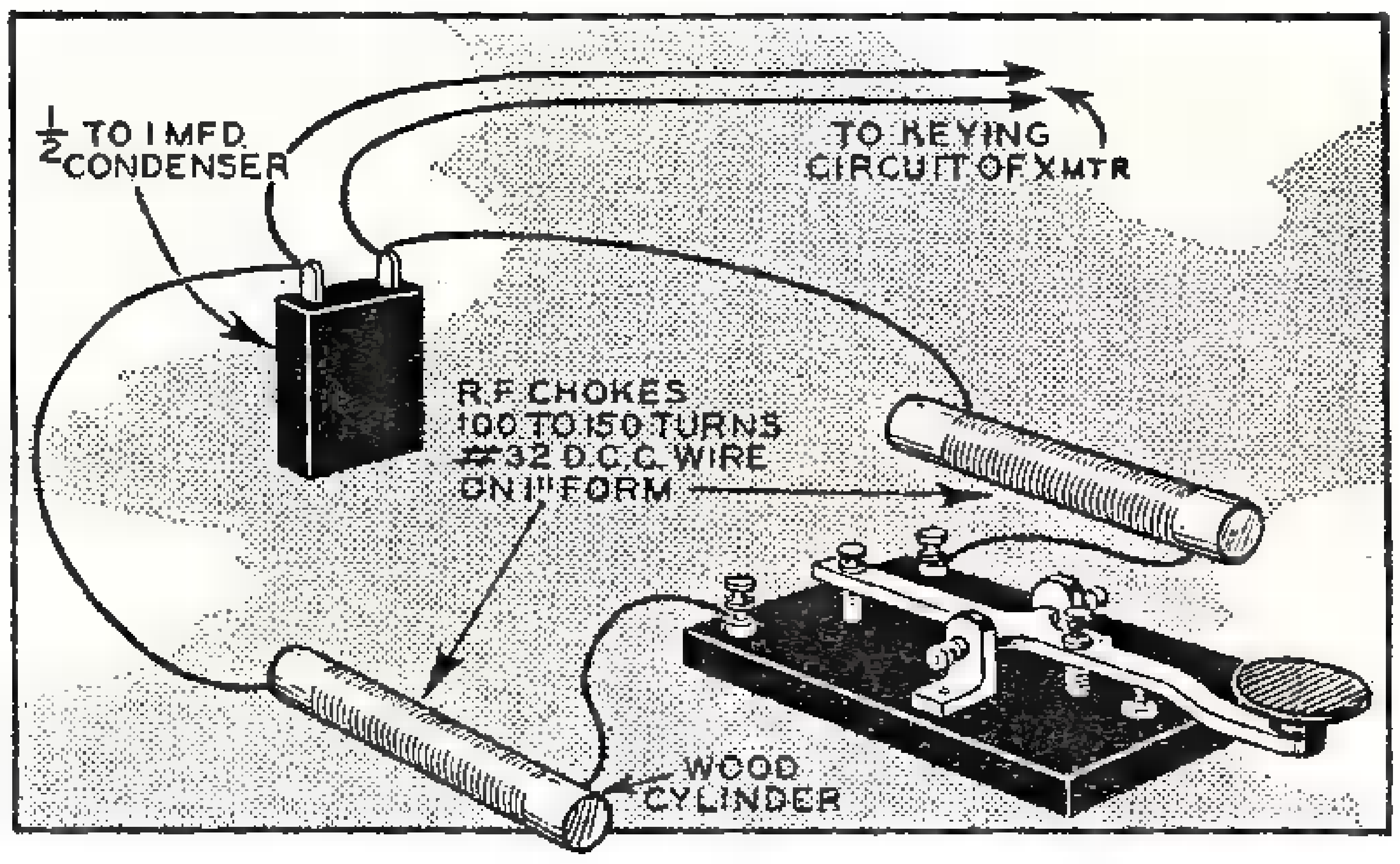

COPPER SCREEN WIRE INSIDE COVER
"B" BATTERY 22½ VOLT BLOCK
16½
25
"A" BATTERY 2-DRY CELLS
.000050 MIDGET COND.
R
S
MIDGET BOOK TYPE CONDENSER
7-9 MEG. LEAK .0001 GRID COND
ANT.
8 OHM FILAMENT RESISTOR
50,000 OHM VARIABLE RESISTOR
SOCKET FOR COILS SEE (A)
F
G
F
P
.00025 BLOCKING CONDENSER
PHONE TIP JACKS
B+ PRI. P
A- SEC. G
AUDIO AMP. TRANS. 3½-1
AMP. 230
DET. 230
UX SOCKETS
TIN FOIL GROUND
GND

Diagram at right shows how parts are wired up in the cigar box. Copper screen antenna for local reception is secured to inside of lid, and connected to the antenna post.

Key Click Filter Eliminates "Thumping" of Transmitter

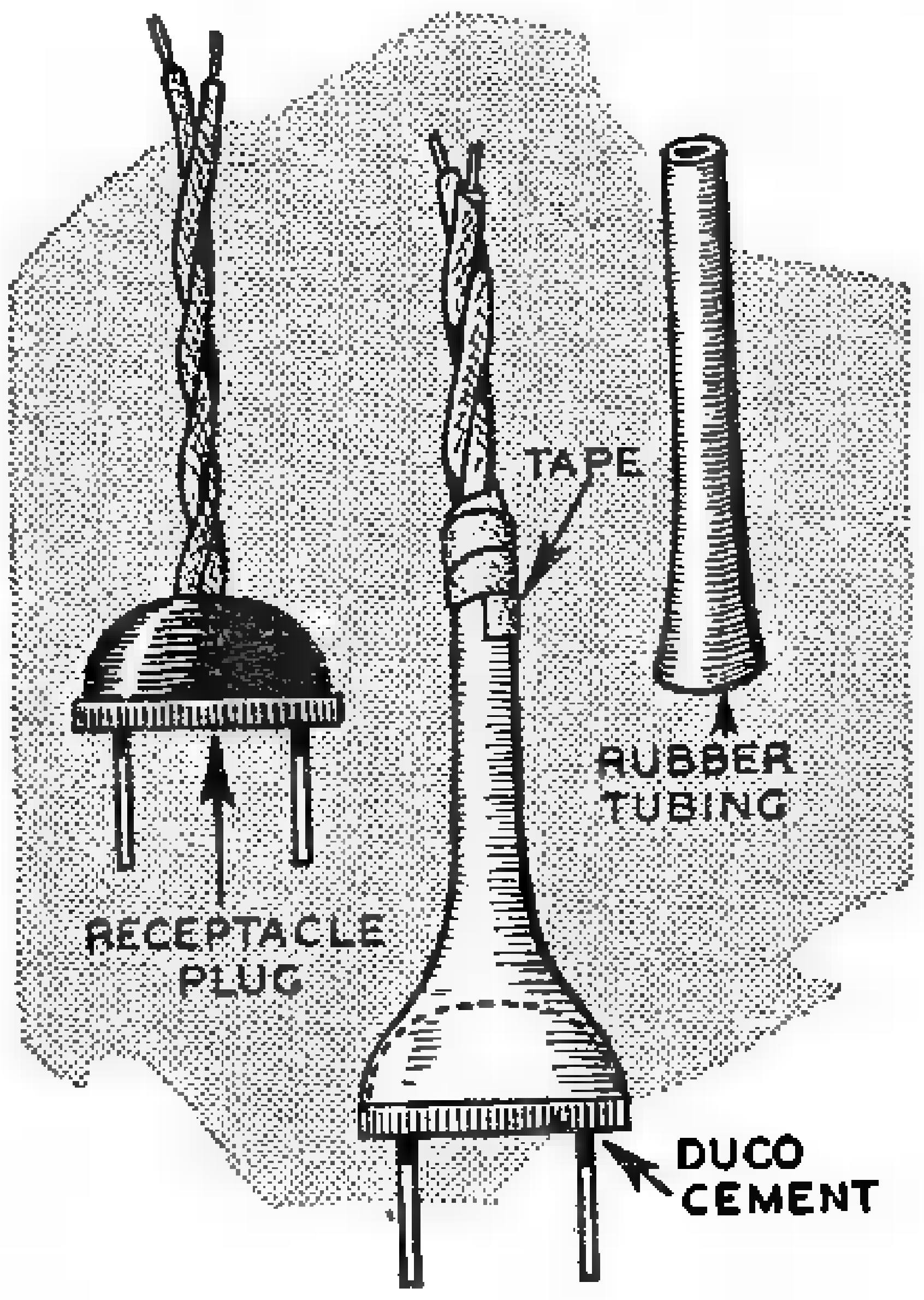
ONE of the chief problems of amateur transmitting is to keep the key clicks or "thumps" from disturbing the broadcast receivers in the neighborhood. The filter shown here seems to be very effective. It consists of two RF chokes in series with the key circuit and a fixed condenser in shunt across it, as the diagram shows. The chokes consist of from 100 to 150 turns of No. 32 DCC wire wound tightly over a 1-inch form such as a window shade roller, and cemented with Duco.

Be sure that the condenser you use has a voltage rating at least twice that which is being used. That is, if you are using a 500-volt plate power use a condenser of at least 1000 volts rating.


½ TO 1 MFD. CONDENSER
TO KEYING CIRCUIT OF XMTR
R.F. CHOKES 100 TO 150 TURNS #32 D.C.C. WIRE ON 1" FORM
WOOD CYLINDER

Transmitter "thumping" is reduced to minimum with this filter, which is hooked into the key circuit as shown here. Use condenser having rating of double plate voltage.

Shock-proof Handle for Plugs


TAPE
RUBBER TUBING
RECEPTACLE PLUG
DUCO CEMENT

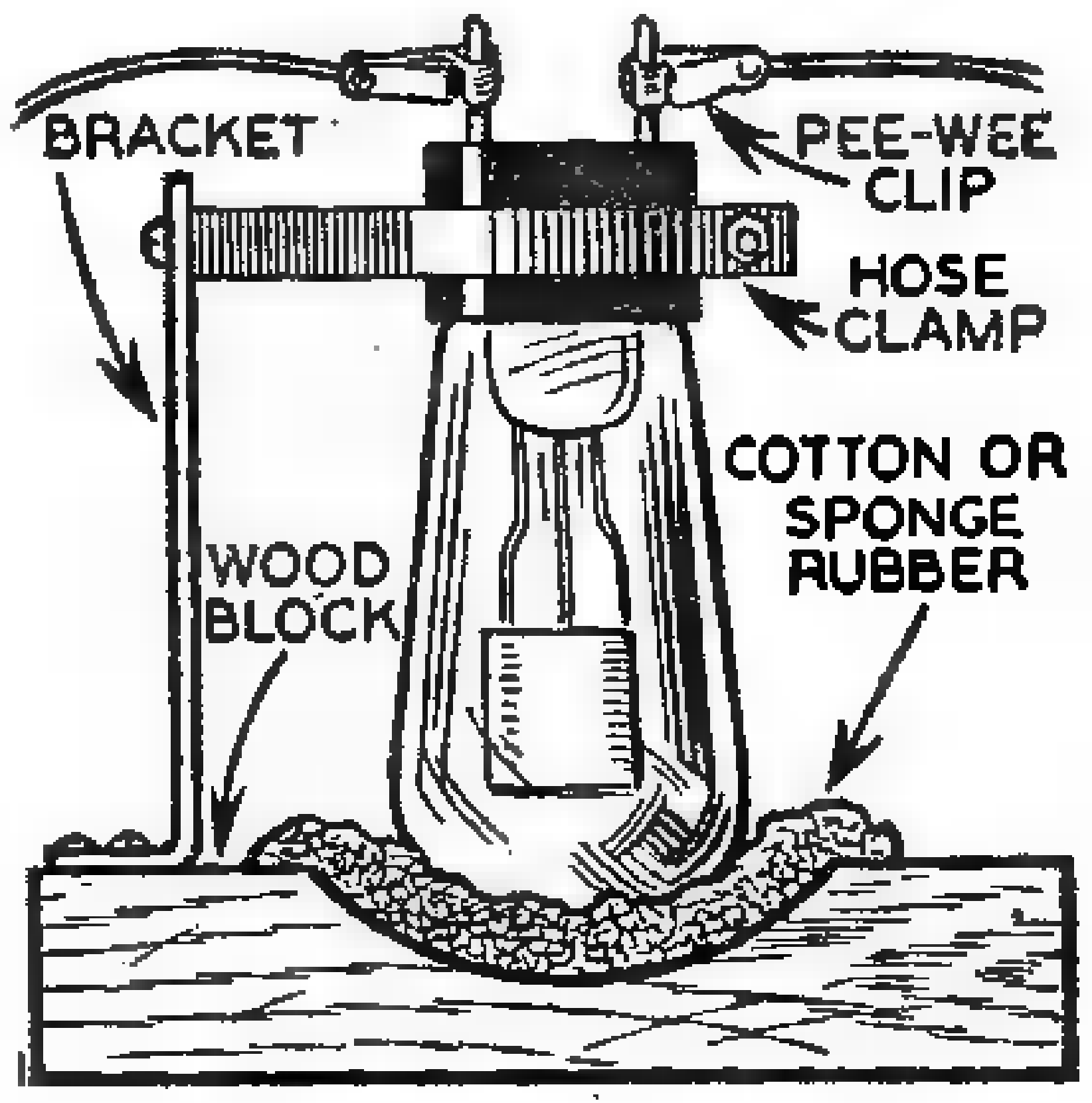
Rubber tubing is slipped over the wire and glued to the plug.

WANT a rubber handle for that receptacle plug? Then cut off about a 3-inch length of rubber tubing and run it down over the cord. Smear the edge of the plug with cement or glue and then stretch the rubber over it until it grips the edge all around. Allow to dry thoroughly and then tape the upper end of tube to cord.

Handy Improvised Tube Socket

MANY is the time when the amateur operating a transmitter cannot find a suitable socket. Well, here's what to do. Get a small block of wood and hollow out a place in the center. Line this with cotton and set the top of the tube right in that. Then support the base, above, by means of a common hose clamp or similar arrangement. Solder or rivet the back of the clamp to an upright bracket, as shown in the accompanying drawing. Then fasten a pee-wee clip to each lead and clip these around the prongs—and there you are.

A tube works just as efficiently upside down as it does in normal position. The scheme works equally well with transmitters employing high-power tubes.

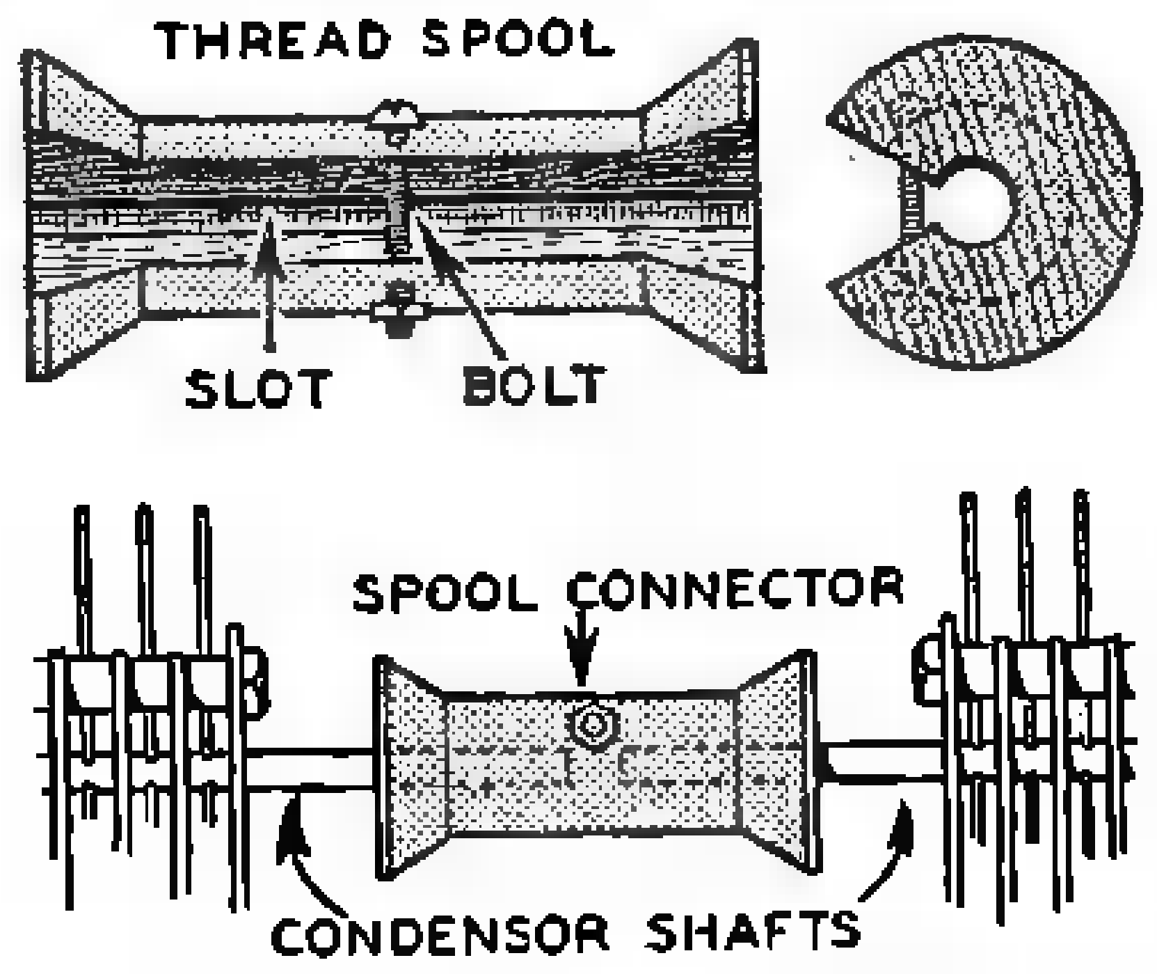

BRACKET
PEE-WEE CLIP
HOSE CLAMP
COTTON OR SPONGE RUBBER
WOOD BLOCK

Hook tube into circuit with wires leading from the clip on prongs.

Spool Makes Firm Shaft Connector

IF YOU'RE in need of a shaft connector to hook up a couple of variable condensers, a common thread spool will do the trick nicely. Put the spools in a vise and with a hacksaw cut a wedge shaped slot lengthwise. Next drill a hole through the body of the spool and run a slender bolt through the hole, with a washer under the head and nut. Take up on the nut and the pinching action will hold the shafts tight.

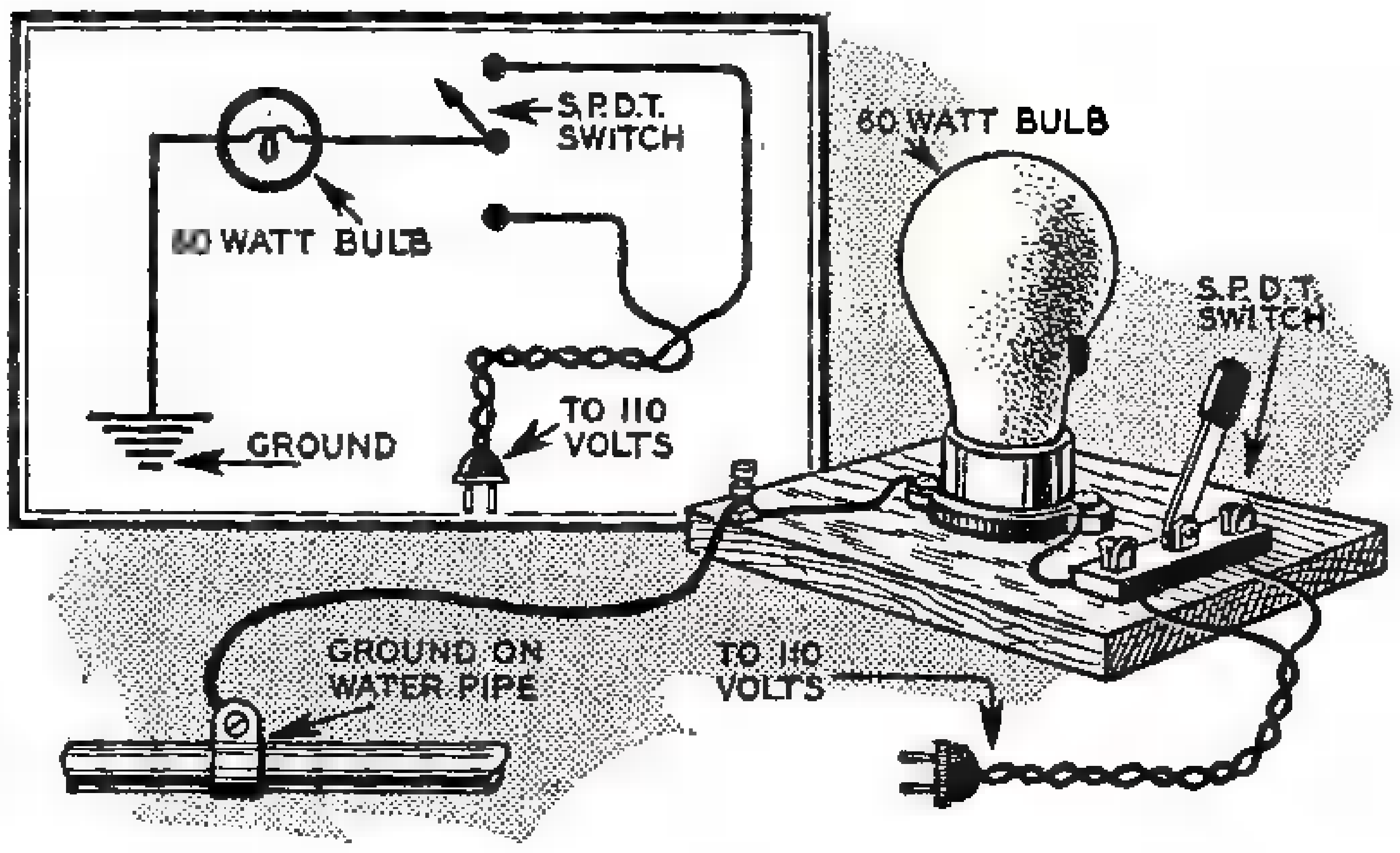
In case the spool opening proves too large for the shaft you can use a little paper as a bushing.


THREAD SPOOL
SLOT
BOLT
SPOOL CONNECTOR
CONDENSOR SHAFTS

When nut is taken up, spool grips ends of condenser shafts.

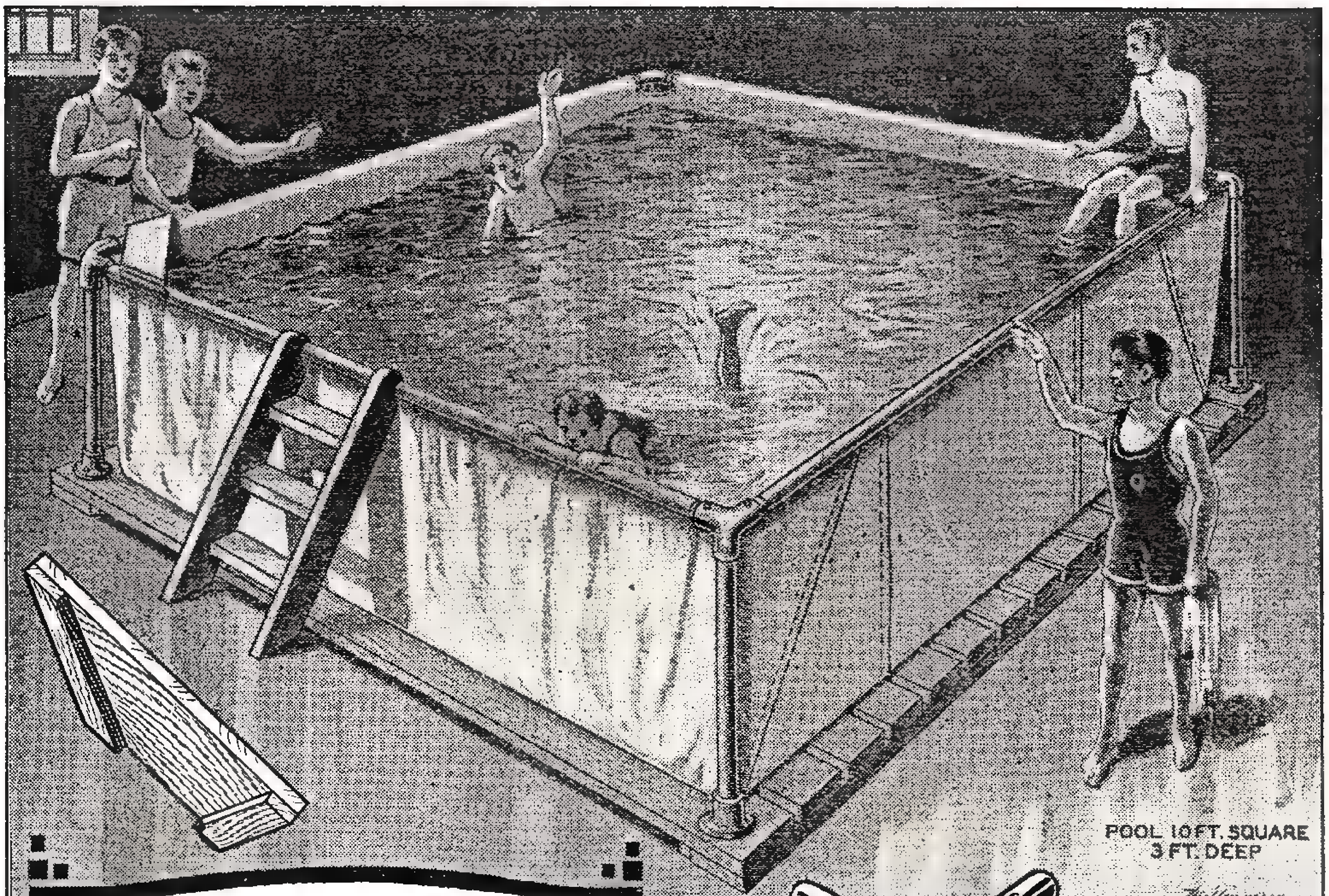
Simple Test for Radio Ground

HERE'S a simple method for testing the efficiency of your ground. On a baseboard mount a S.P.D.T. switch and a light socket, and hook up the arrangement as shown in the wiring diagram. Throw the switch to the side that lights the bulb. If the bulb shines as brightly as those of equal wattage in your house, your ground is fine, if it burns dimly your ground is poor and needs overhauling.


S.P.D.T. SWITCH
60 WATT BULB
GROUND
TO 110 VOLTS
60 WATT BULB
S.P.D.T. SWITCH
GROUND ON WATER PIPE
TO 110 VOLTS

Mount parts of tester on baseboard and wire up as shown.

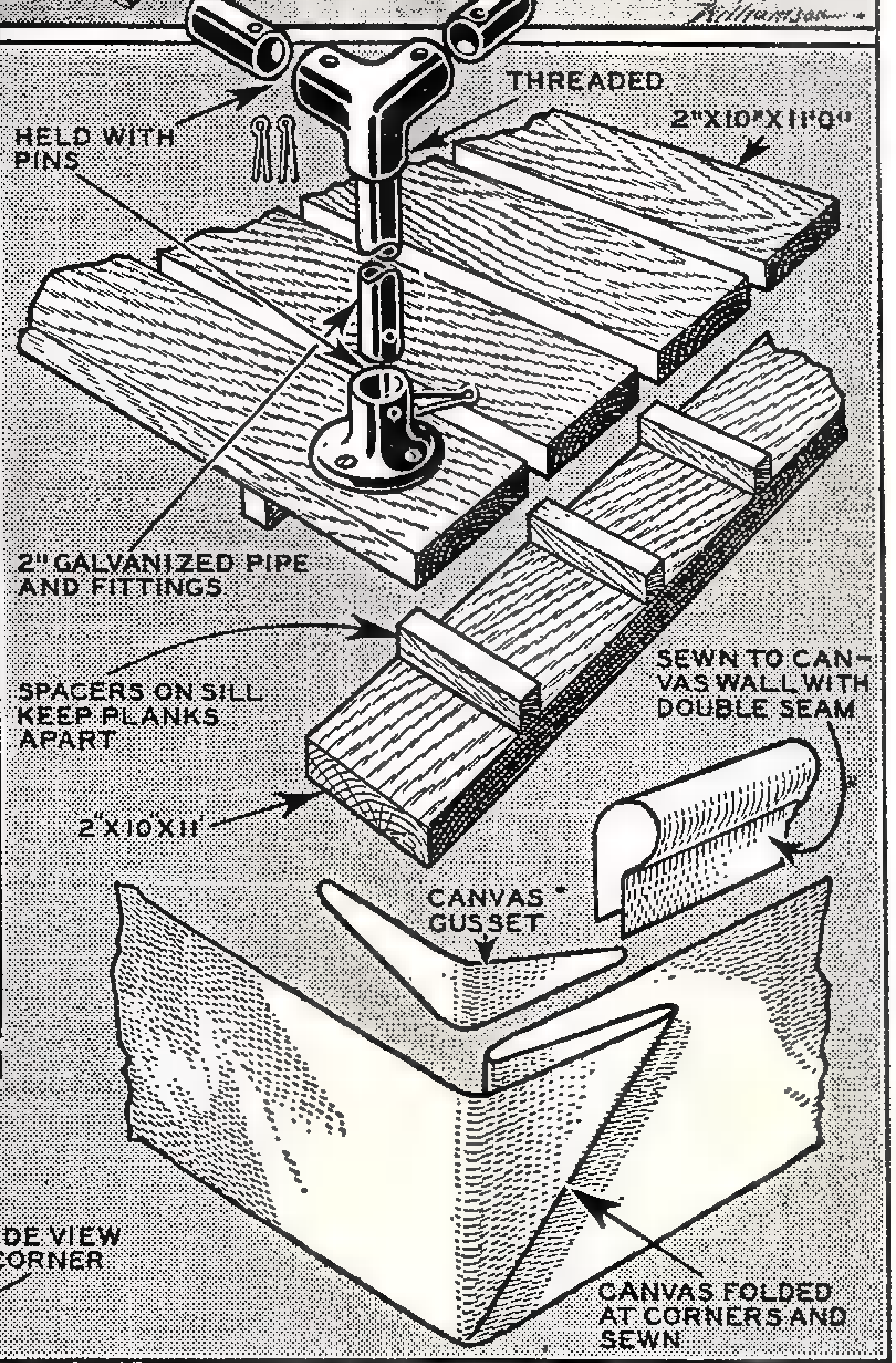
Set Up Portable Swimpool in Back Yard

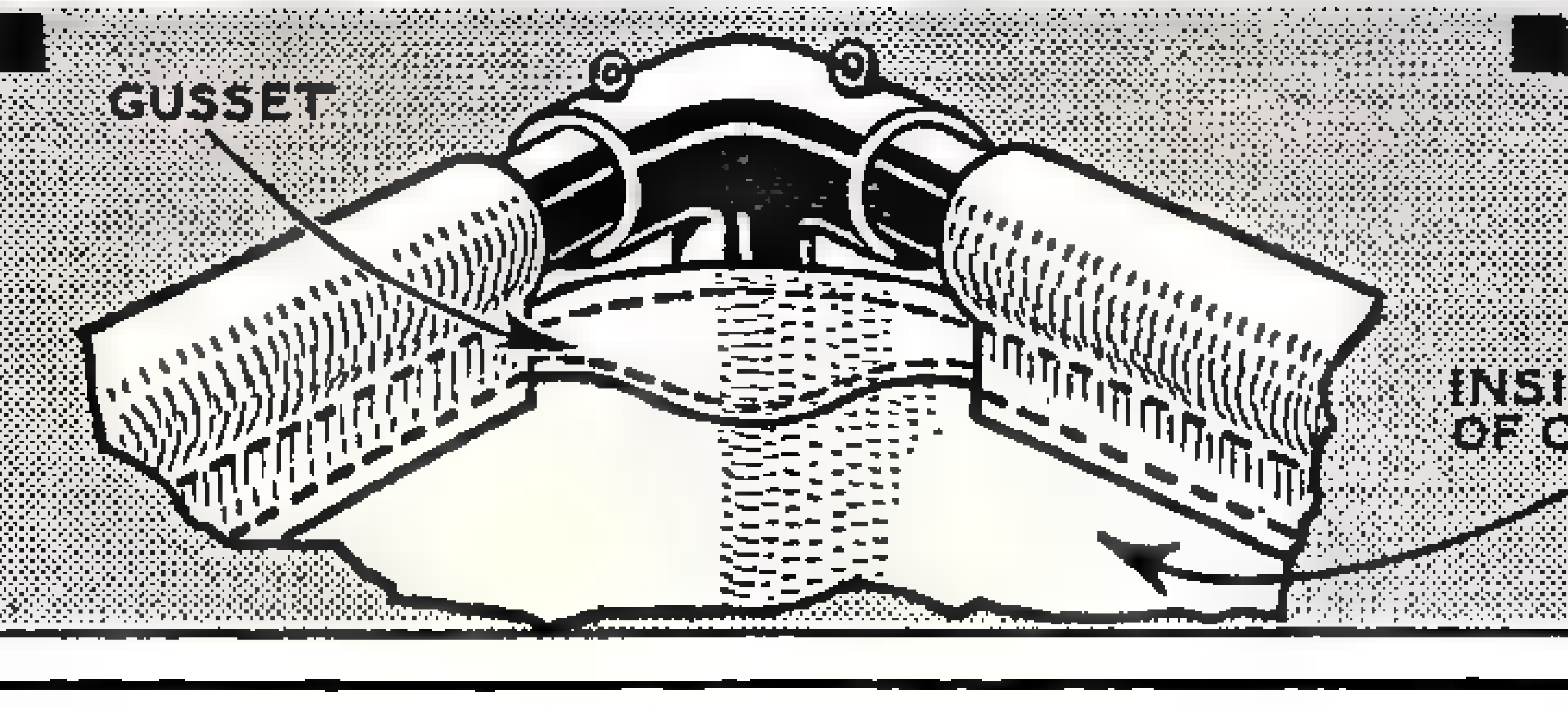

POOL 10 FT. SQUARE
3 FT. DEEP
Williamson

THIS portable bathing pool for children is designed so that it can be set up anywhere without damage to the lawn, or taken down easily and stored in small space. The tank itself is three ft. deep and ten ft. square, made of brown waterproof canvas sewn with double seams and folded at ends, as shown. A wide hem is sewn on each side for the pipe supports and there is a reinforcing gusset in each corner.

In order that the bottom of the filled tank will not rest directly on the ground a substantial plank floor is provided, as illustrated. A short ladder and corner seats greatly add to the convenience of the pool. For draining, the water is siphoned out with a hose on to shrubbery or garden.

The tank can easily be made two or three feet deeper, as well as wider, if desired.

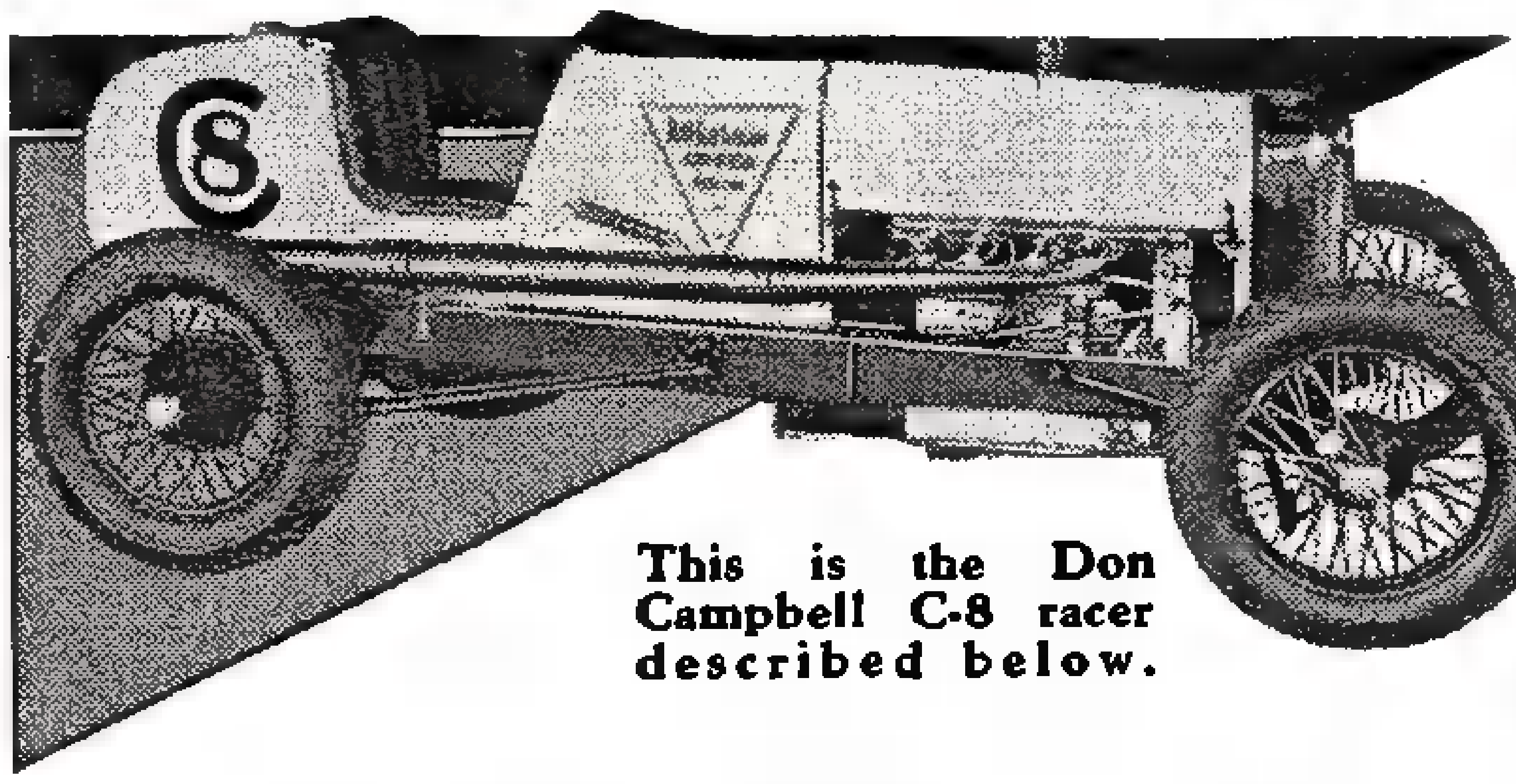

HELD WITH PINS
THREADED
2"X10"X11'0"
2" GALVANIZED PIPE AND FITTINGS
SPACERS ON SILL KEEP PLANKS APART
2"X10X11'
SEWN TO CANVAS WALL WITH DOUBLE SEAM
CANVAS GUSSET
CANVAS FOLDED AT CORNERS AND SEWN


GUSSET
INSIDE VIEW OF CORNER

Drawings show how corner braces are erected to support tank. Note ends of horizontal pipes attach to fitting with pins.

PLANS for

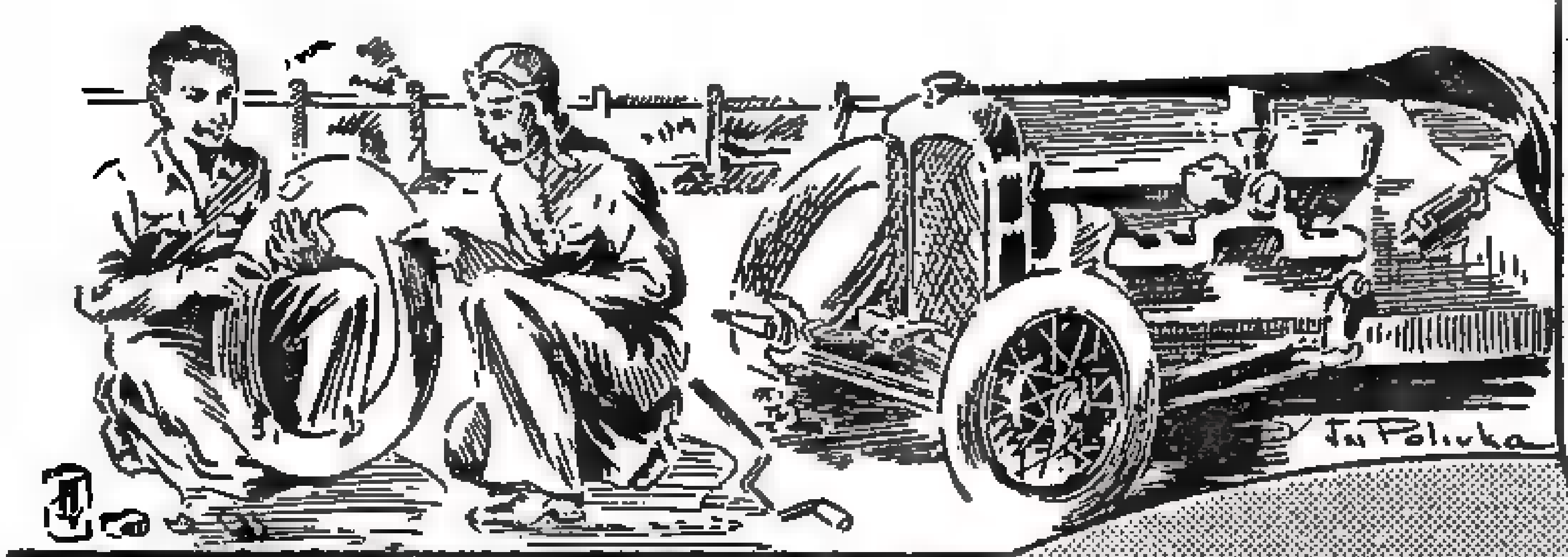
for Dirt Track Competition

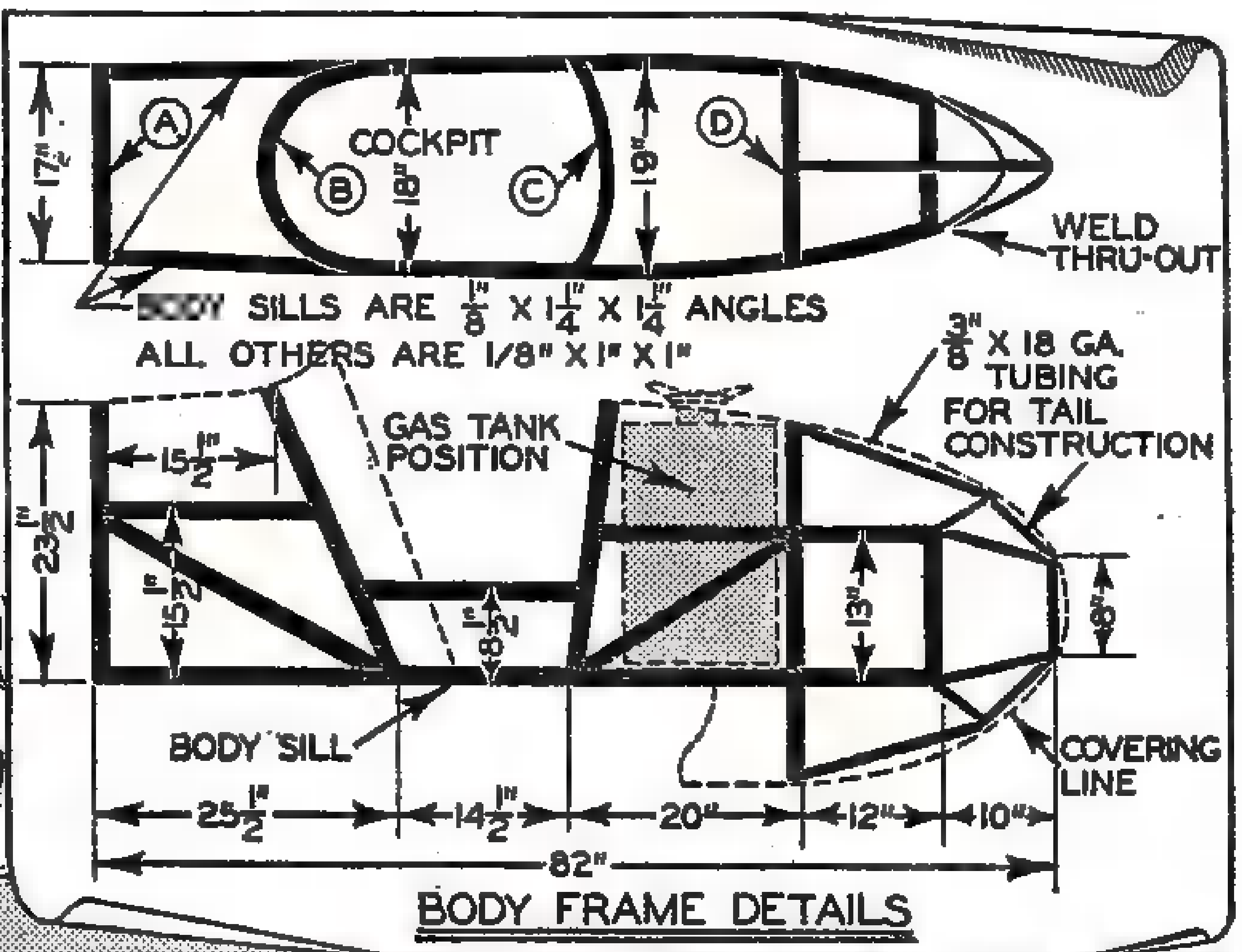


This is the Don Campbell C-8 racer described below.

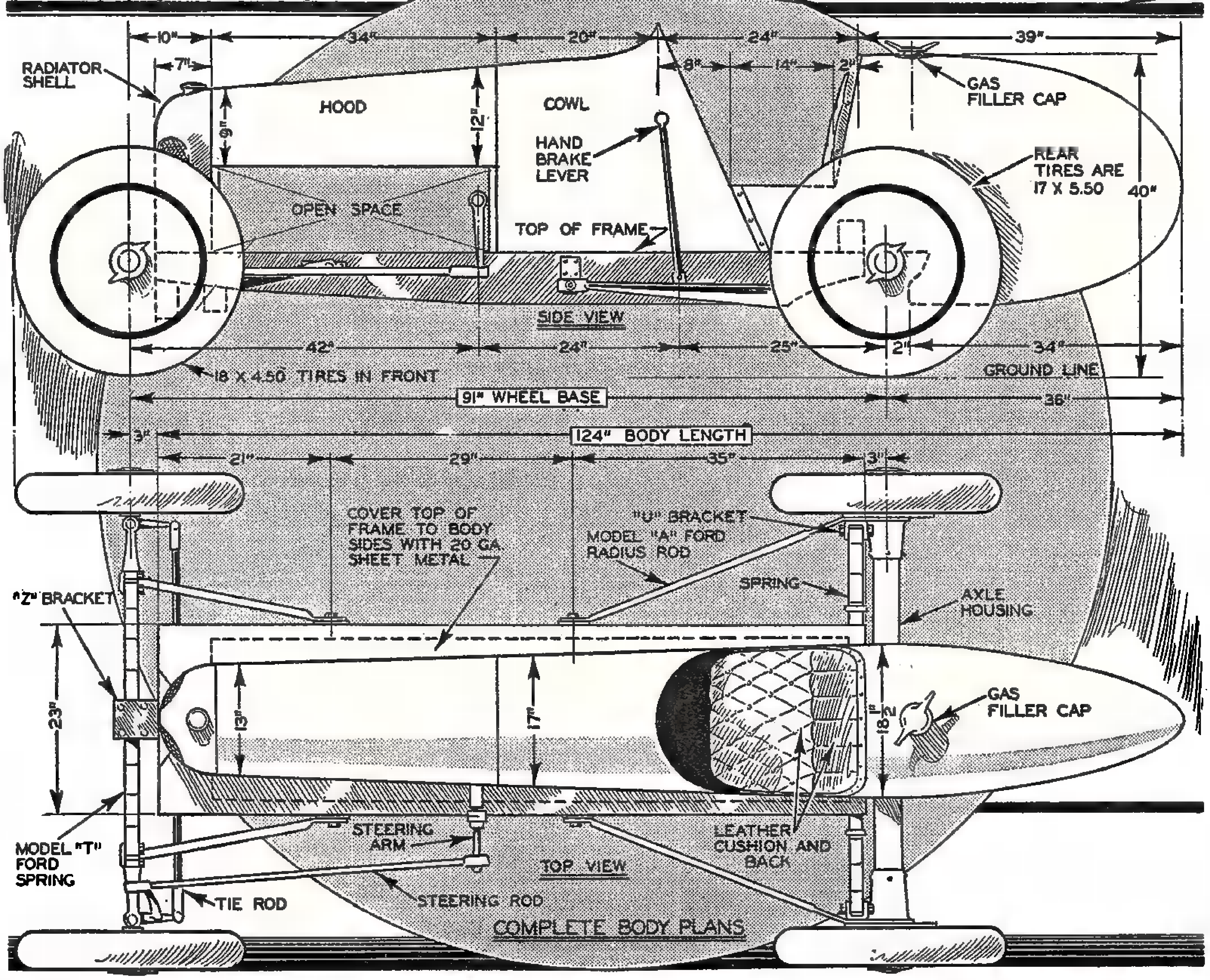
ALL the important features of design of the Don Campbell C-8 dirt track racing car, which gave a good account of itself on the dirt tracks during the last racing season, are illustrated in these drawings and photos. It will be noted that a standard tread of 56 inches is used, also that the wheelbase of the racer is 91 inches. In some instances the wheelbase is cut down to as low as 84 inches and in other cases it runs as high as 100 inches, for dirt track work.

Note that the frame used under this racer is constructed from Model T Ford side members and cross members. Two front end cross members are mounted, one of them being designed to carry the front spring Z-bracket and the other designed as an engine mount; the engine mount being 6 inches back of the front spring mount. The side members are cut off at the rear end and fitted to the conventional Model T rear cross member, which is used to mount the rear spring. The projecting ends of the




A
B
C
D
COCKPIT
17½"
18"
19"
WELD THRU-OUT
BODY SILLS ARE ⅛" X 1¼" X 1¼" ANGLES
ALL OTHERS ARE 1/8" X 1" X 1"
⅜" X 18 GA. TUBING FOR TAIL CONSTRUCTION
GAS TANK POSITION
15½"
23½"
15½"
8½"
13"
8"
BODY SILL
COVERING LINE
25½"
14½"
20"
12"
10"
82"

BODY FRAME DETAILS


10"
7"
34"
20"
24"
8"
14"
2"
39"
RADIATOR SHELL
HOOD
9"
12"
COWL
HAND BRAKE LEVER
GAS FILLER CAP
REAR TIRES ARE 17 X 5.50
40"
OPEN SPACE
TOP OF FRAME
SIDE VIEW
42"
24"
25"
2"
34"
18 X 4.50 TIRES IN FRONT
GROUND LINE
91" WHEEL BASE
36"
3"
124" BODY LENGTH
21"
29"
35"
3"
COVER TOP OF FRAME TO BODY SIDES WITH 20 GA. SHEET METAL
"U" BRACKET
MODEL "A" FORD RADIUS ROD
SPRING
AXLE HOUSING
"Z" BRACKET
23"
13"
17"
18½"
GAS FILLER CAP
MODEL "T" FORD SPRING
TIE ROD
STEERING ARM
STEERING ROD
TOP VIEW
LEATHER CUSHION AND BACK

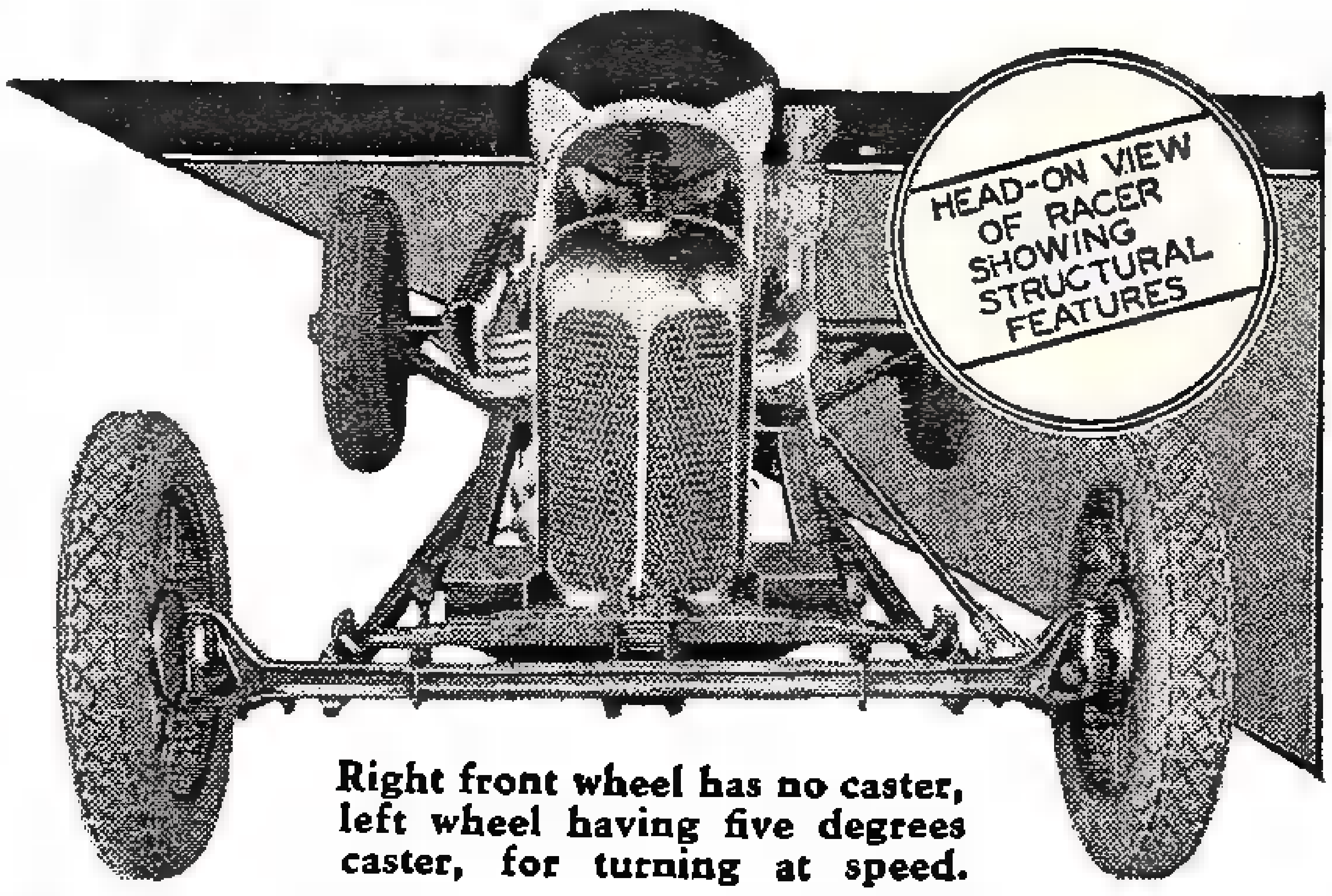
COMPLETE BODY PLANS

a RACER

by RAY F. KUNS

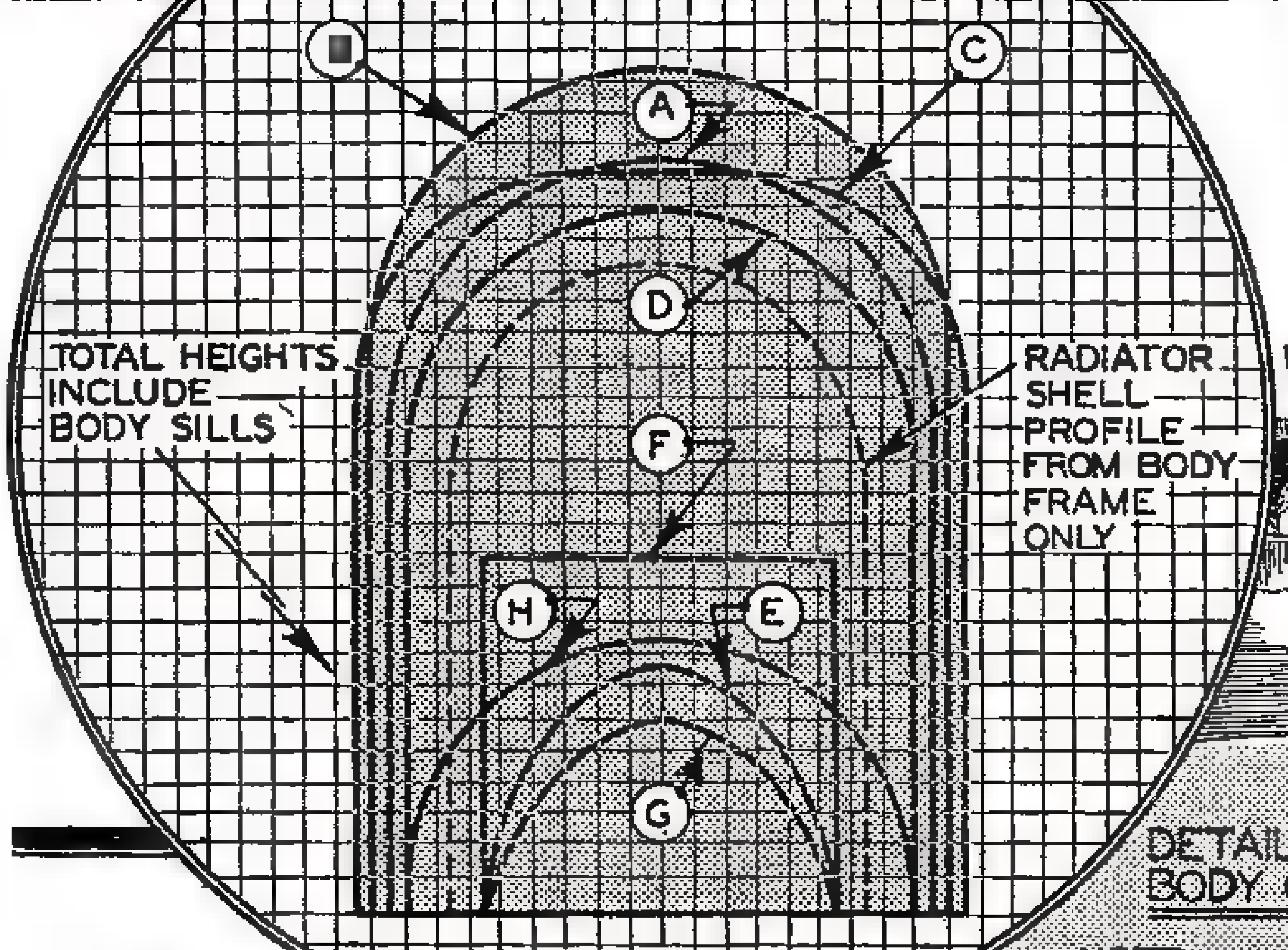
rear cross bracket are cut off. Special spring brackets are used which give an underslinging effect for the rear. The original width of the frame, that is, 23 inches, has been held to.

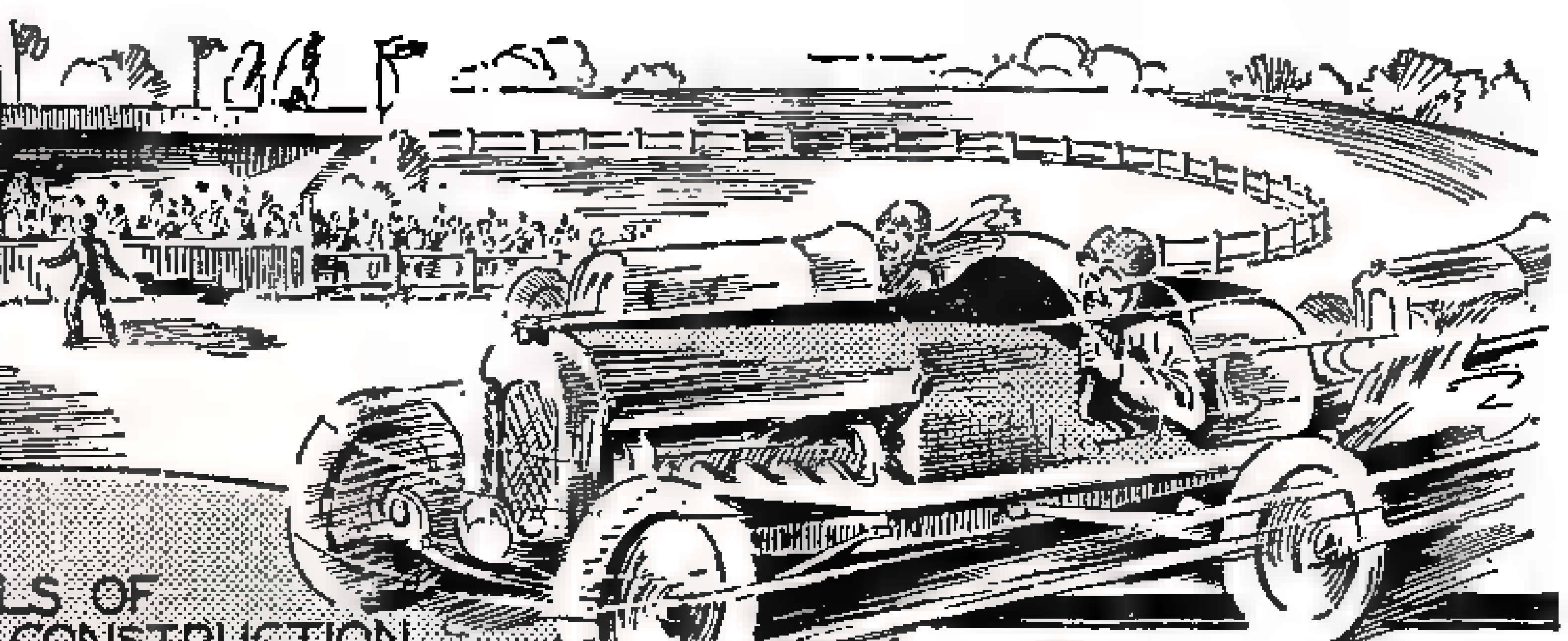
The weight of one of these dirt track racers should not exceed 1500 lbs., the one shown being approximately 1400 pounds. Owing to the fact that these cars are used on half-mile dirt tracks, it is necessary to give thought to their performance on this type of track. While the car must be low, it must not be too low or you will have what is known as a "floater." A floater is a car which tends to slip away from

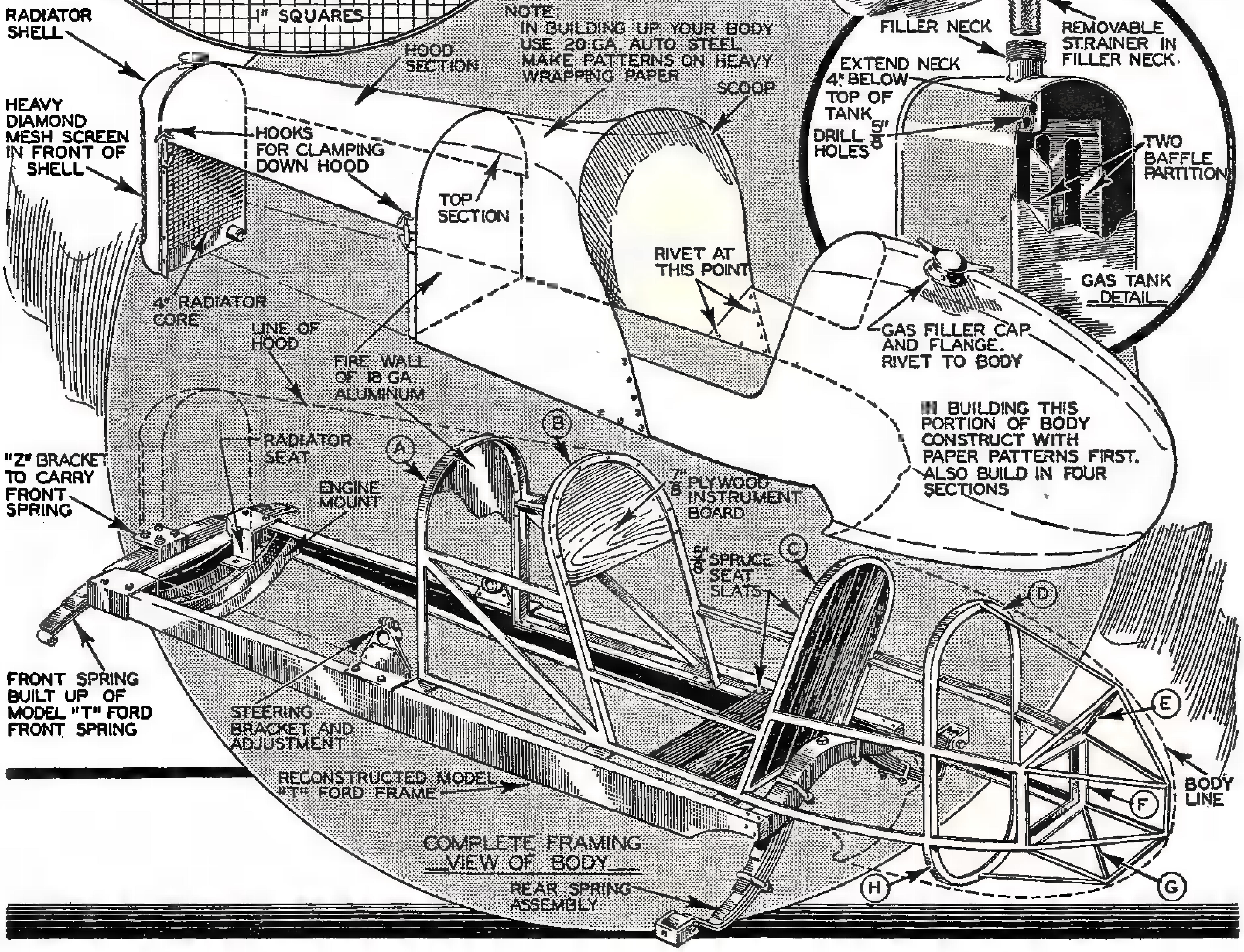

HEAD-ON VIEW OF RACER SHOWING STRUCTURAL FEATURES

Right front wheel has no caster, left wheel having five degrees caster, for turning at speed.

SHOWN BELOW ARE THE COMPLETE FRAME AND BRACE PROFILES FOR THE VARIOUS STATIONS


B
A
C
D
F
H
E
G
TOTAL HEIGHTS INCLUDE BODY SILLS
RADIATOR SHELL PROFILE FROM BODY FRAME ONLY
1" SQUARES

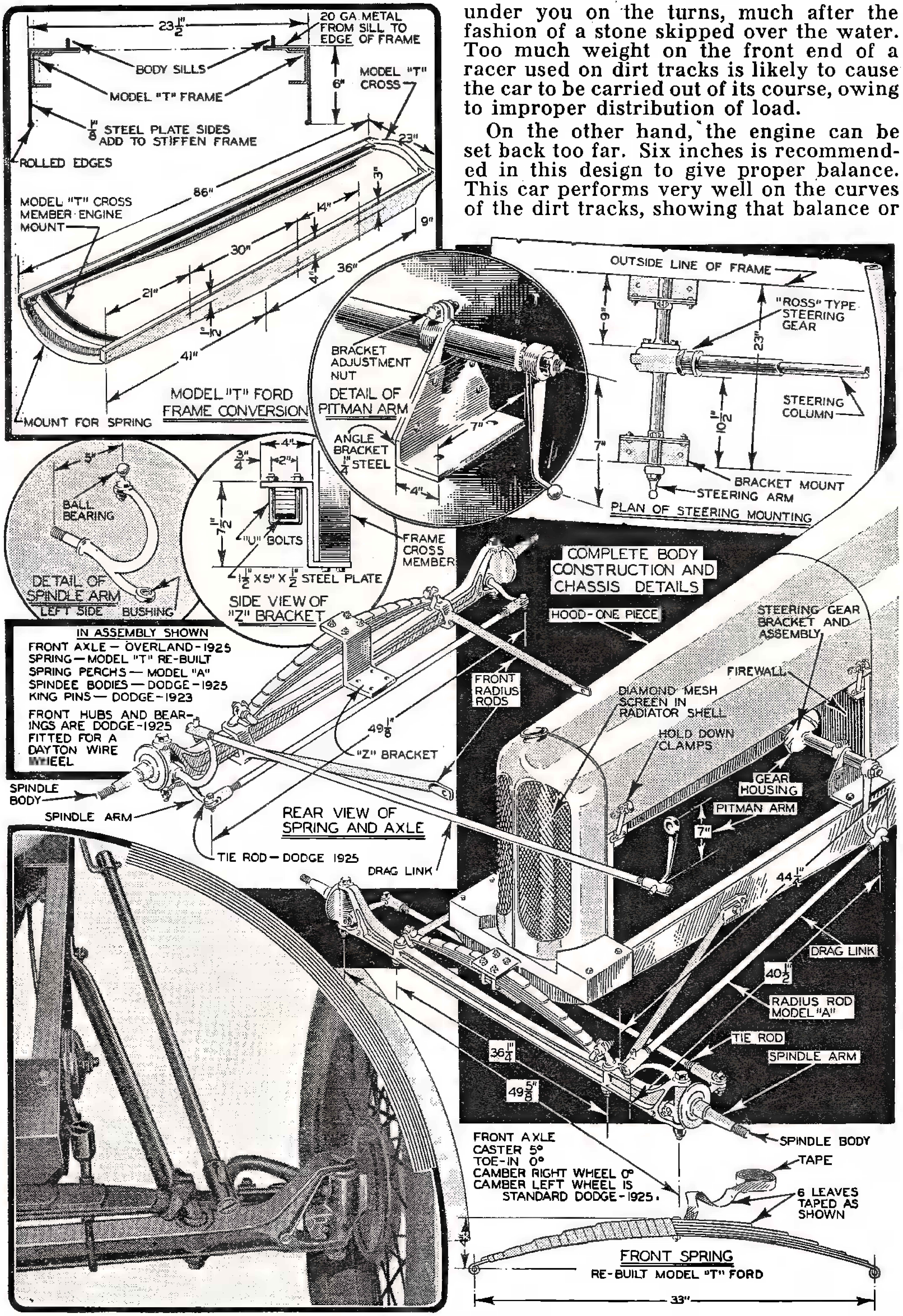



DETAILS OF BODY CONSTRUCTION
NOTE: IN BUILDING UP YOUR BODY USE 20 GA. AUTO STEEL. MAKE PATTERNS ON HEAVY WRAPPING PAPER
RADIATOR SHELL
HEAVY DIAMOND MESH SCREEN IN FRONT OF SHELL
HOOD SECTION
HOOKS FOR CLAMPING DOWN HOOD
TOP SECTION
SCOOP
4" RADIATOR CORE
LINE OF HOOD
FIRE WALL OF 18 GA. ALUMINUM
RIVET AT THIS POINT
FILLER NECK
REMOVABLE STRAINER IN FILLER NECK.
EXTEND NECK 4" BELOW TOP OF TANK
5/8" DRILL HOLES
TWO BAFFLE PARTITION
GAS TANK DETAIL
GAS FILLER CAP AND FLANGE. RIVET TO BODY
IN BUILDING THIS PORTION OF BODY CONSTRUCT WITH PAPER PATTERNS FIRST. ALSO BUILD IN FOUR SECTIONS
"Z" BRACKET TO CARRY FRONT SPRING
RADIATOR SEAT
ENGINE MOUNT
A
B
7/8" PLYWOOD INSTRUMENT BOARD
5/8" SPRUCE SEAT SLATS
C
D
E
F
G
H
BODY LINE
FRONT SPRING BUILT UP OF MODEL "T" FORD FRONT SPRING
STEERING BRACKET AND ADJUSTMENT
RECONSTRUCTED MODEL "T" FORD FRAME
COMPLETE FRAMING VIEW OF BODY
REAR SPRING ASSEMBLY

Details of Chassis Reinforcement, Spring Suspension Told by Drawings

under you on the turns, much after the fashion of a stone skipped over the water. Too much weight on the front end of a racer used on dirt tracks is likely to cause the car to be carried out of its course, owing to improper distribution of load.

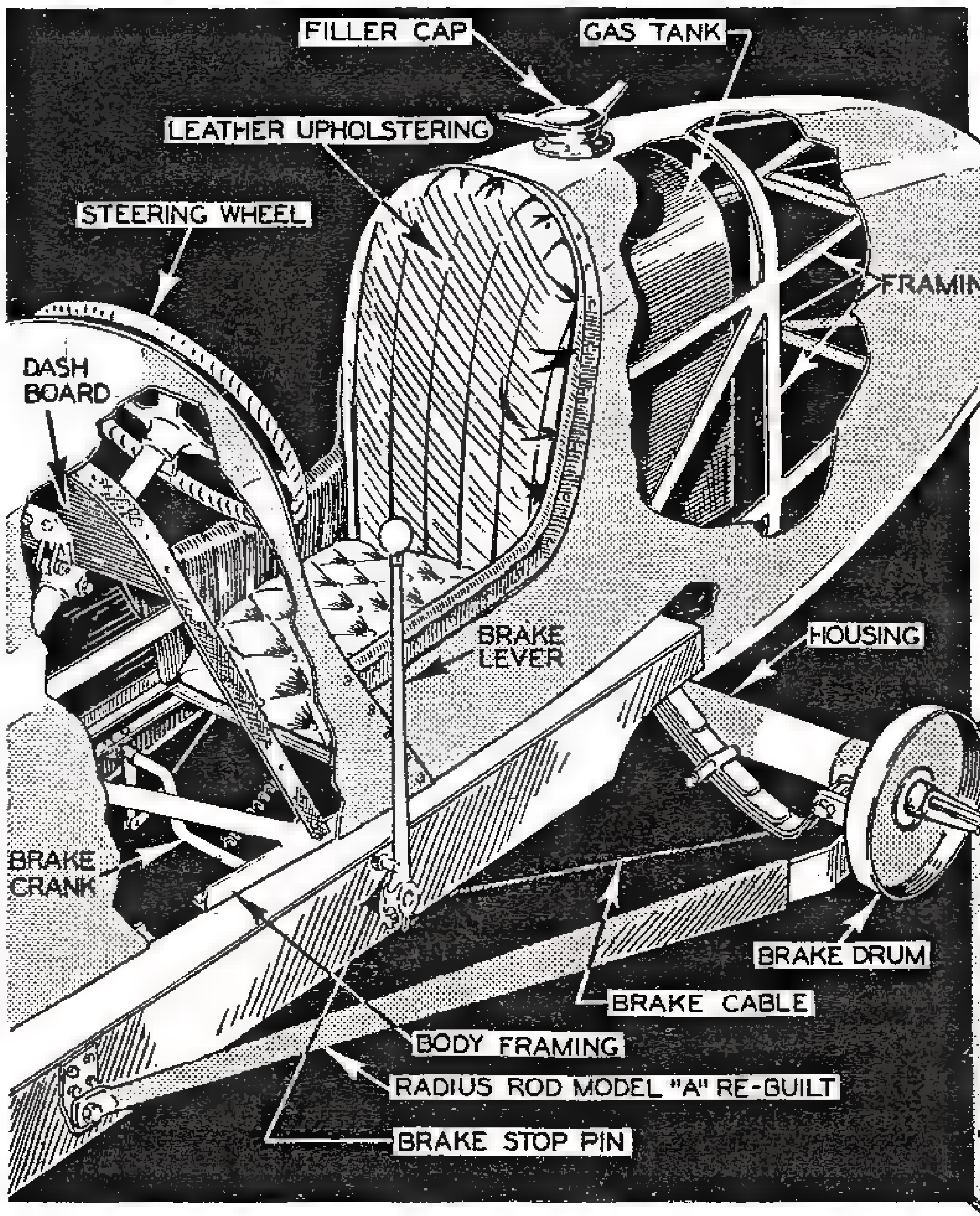
On the other hand, the engine can be set back too far. Six inches is recommended in this design to give proper balance. This car performs very well on the curves of the dirt tracks, showing that balance or


23½"
20 GA METAL FROM SILL TO EDGE OF FRAME
BODY SILLS
MODEL "T" CROSS
MODEL "T" FRAME
6"
⅛" STEEL PLATE SIDES ADD TO STIFFEN FRAME
ROLLED EDGES
23"
MODEL "T" CROSS MEMBER ENGINE MOUNT
86"
3"
14"
9"
30"
4½"
36"
21"
1"
41"
MOUNT FOR SPRING
MODEL "T" FORD FRAME CONVERSION
BRACKET ADJUSTMENT NUT
DETAIL OF PITMAN ARM
7"
ANGLE BRACKET ¼" STEEL
4"
OUTSIDE LINE OF FRAME
"ROSS" TYPE STEERING GEAR
9"
23"
STEERING COLUMN
10½"
7"
BRACKET MOUNT
STEERING ARM
PLAN OF STEERING MOUNTING
5"
BALL BEARING
DETAIL OF SPINDLE ARM
LEFT SIDE
BUSHING
4"
¾"
2"
7½"
"U" BOLTS
FRAME CROSS MEMBER
1½" X 5" X ½" STEEL PLATE
SIDE VIEW OF "Z" BRACKET
IN ASSEMBLY SHOWN
FRONT AXLE — OVERLAND-1925
SPRING — MODEL "T" RE-BUILT
SPRING PERCHS — MODEL "A"
SPINDEE BODIES — DODGE-1925
KING PINS — DODGE-1923
FRONT HUBS AND BEARINGS ARE DODGE-1925 FITTED FOR A DAYTON WIRE WHEEL
SPINDLE BODY
SPINDLE ARM
49⅛"
"Z" BRACKET
REAR VIEW OF SPRING AND AXLE
TIE ROD — DODGE 1925
DRAG LINK
COMPLETE BODY CONSTRUCTION AND CHASSIS DETAILS
HOOD-ONE PIECE
FRONT RADIUS RODS
STEERING GEAR BRACKET AND ASSEMBLY
FIREWALL
DIAMOND MESH SCREEN IN RADIATOR SHELL
HOLD DOWN CLAMPS
GEAR HOUSING
PITMAN ARM
7"
44¼"
DRAG LINK
40½"
RADIUS ROD MODEL "A"
TIE ROD
SPINDLE ARM
36¼"
49⅝"
FRONT AXLE
CASTER 5°
TOE-IN 0°
CAMBER RIGHT WHEEL 0°
CAMBER LEFT WHEEL IS STANDARD DODGE-1925.
SPINDLE BODY
TAPE
6 LEAVES TAPED AS SHOWN
FRONT SPRING
RE-BUILT MODEL "T" FORD
33"

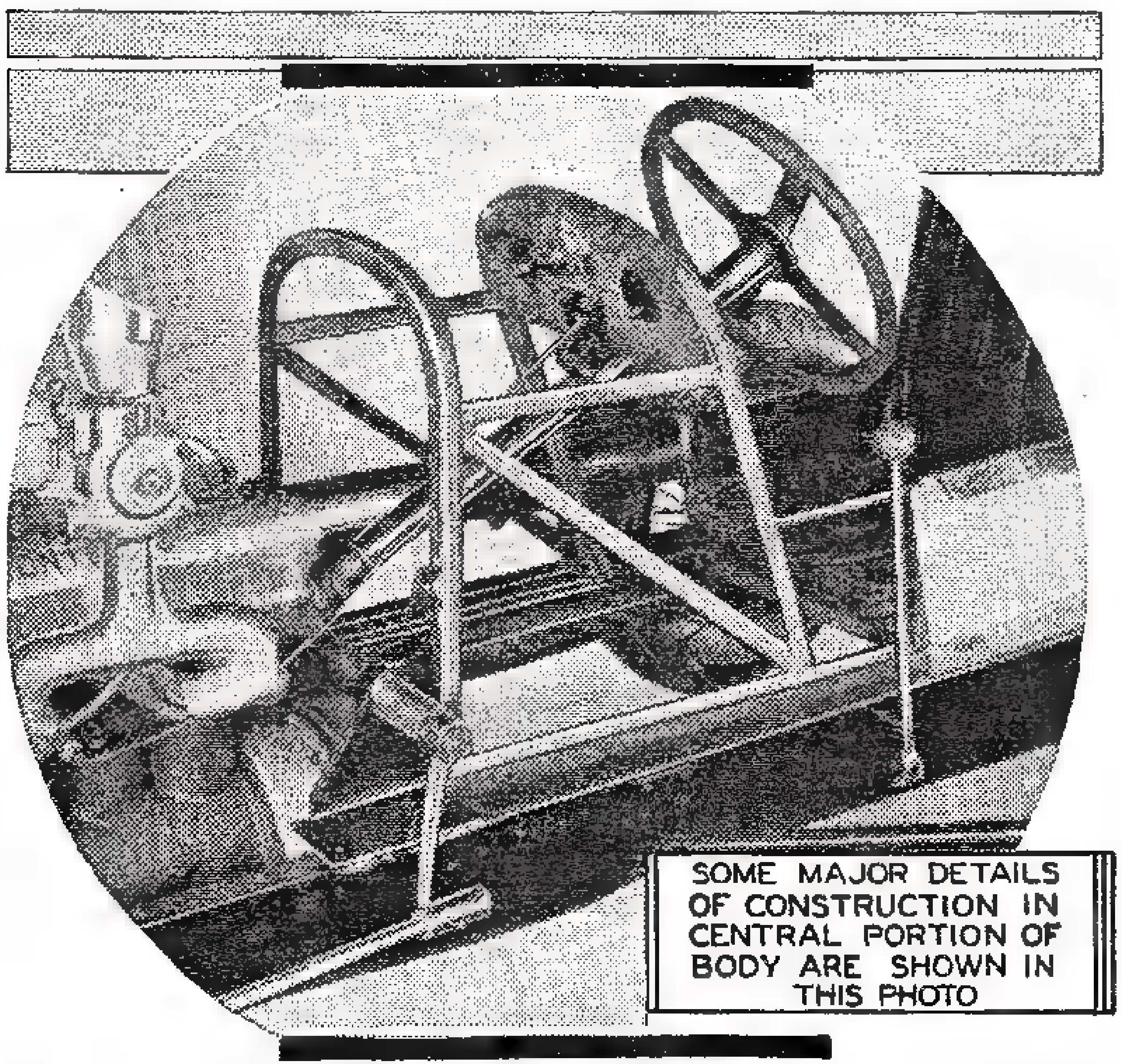
The tie-rod and radius rod hook-ups are shown in the photo immediately above. Front spring suspension, spindle arm details, and method of stiffening frame are shown in the drawings. Note the taped front spring, which is rebuilt.

Mounting of Radius Rods, Brake Cables Done With Eye to Accessibility

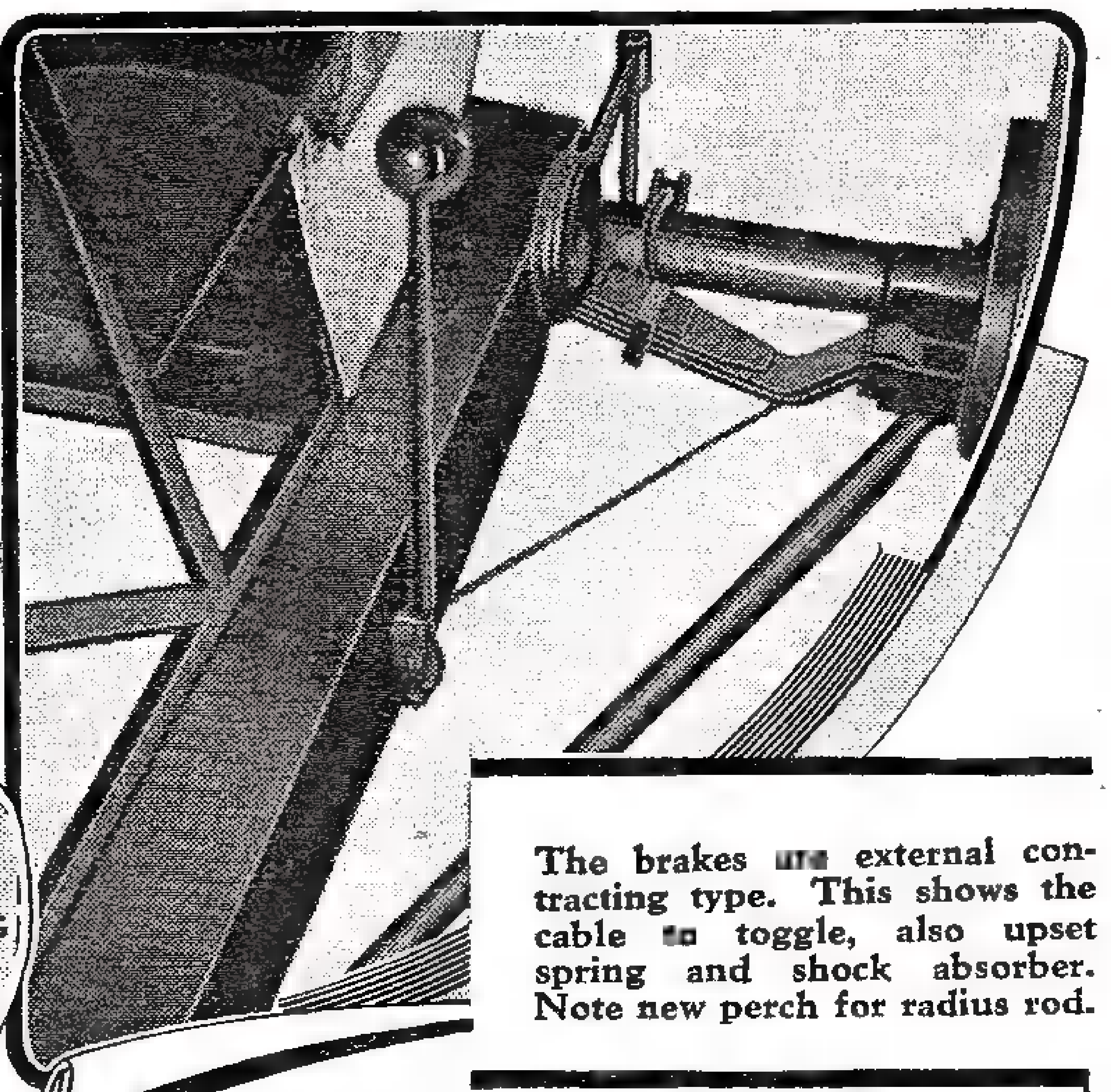
distribution of weight is about right. It has a record of 24.2 seconds for the Cincinnati-Hamilton half-mile track and 23.4 seconds for the Winchester, Indiana track. The ability to get around the track in record-making time is a question of car balance. No matter how skilled the driver, the car must "handle." The chassis of the C-8 will take any of the lighter four-cylinder engines; in fact, has had several different engines in it.


FILLER CAP
GAS TANK
LEATHER UPHOLSTERING
STEERING WHEEL
FRAMING
DASH BOARD
BRAKE LEVER
HOUSING
BRAKE CRANK
BRAKE DRUM
BRAKE CABLE
BODY FRAMING
RADIUS ROD MODEL "A" RE-BUILT
BRAKE STOP PIN

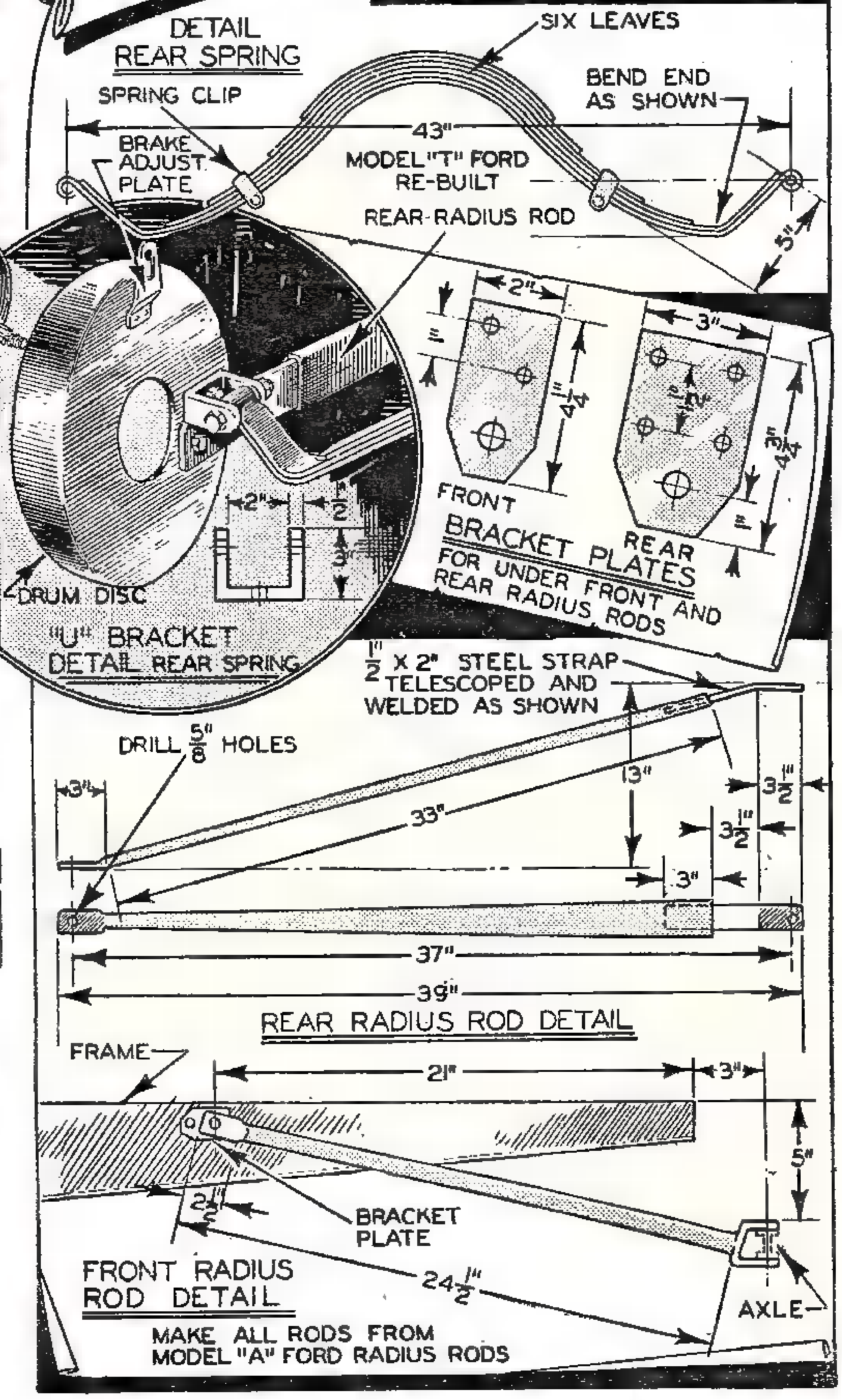
Immediately above is shown the disposition of the gas tank, seat and brake lever cross arm. To the right is shown rebuilt "T" Ford rear spring, new perch and drum disc.


SOME MAJOR DETAILS OF CONSTRUCTION IN CENTRAL PORTION OF BODY ARE SHOWN IN THIS PHOTO

The steering wheel is set just off the center line, as shown above and in the top right drawing, opposite page. The placing of Pitman rod and body frames is also shown here.



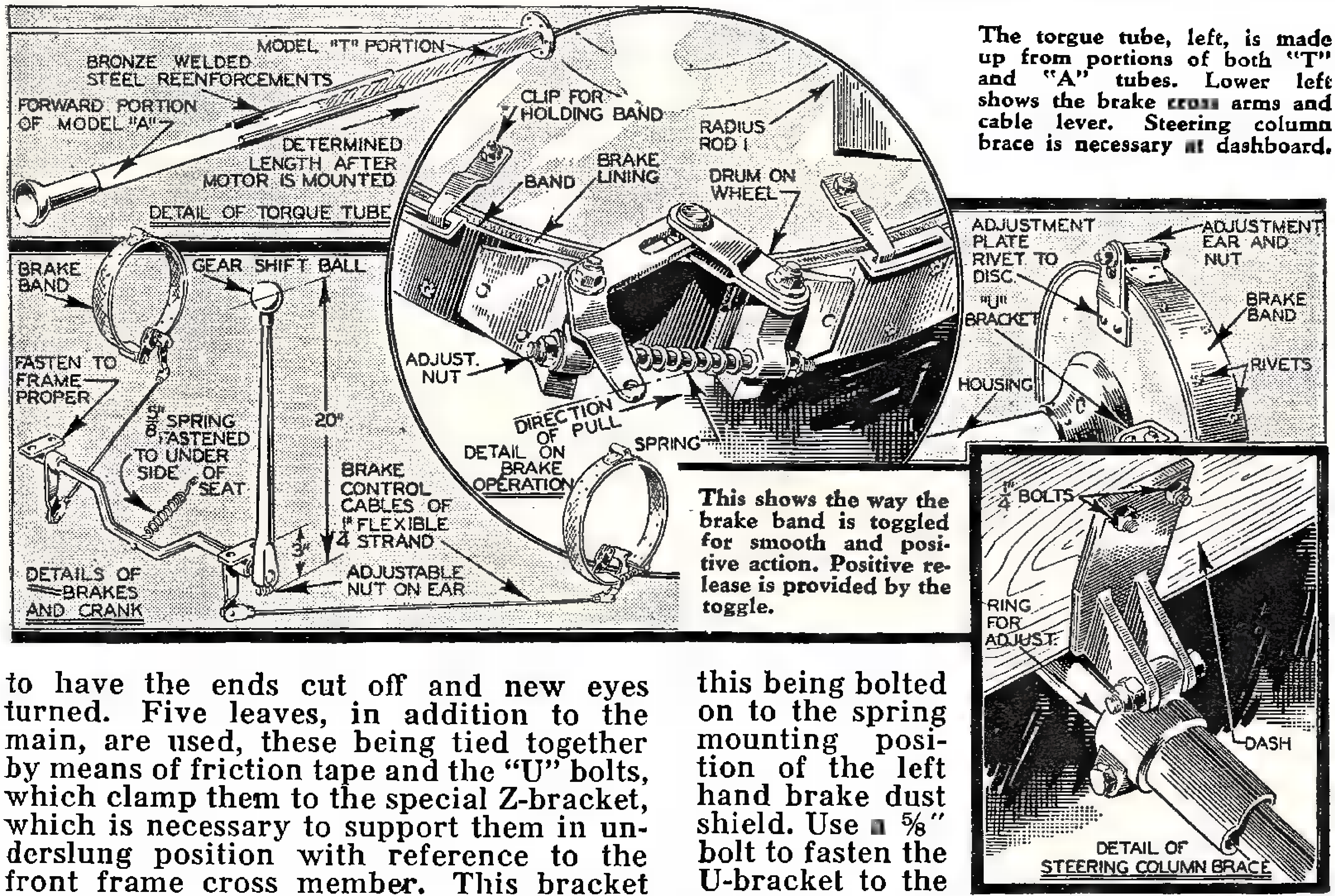
The brakes are external contracting type. This shows the cable to toggle, also upset spring and shock absorber. Note new perch for radius rod.


DETAIL REAR SPRING
SIX LEAVES
SPRING CLIP
BEND END AS SHOWN
BRAKE ADJUST PLATE
43"
MODEL "T" FORD RE-BUILT
REAR RADIUS ROD
5"
2"
3"
4 1/4"
1"
FRONT
REAR
BRACKET PLATES FOR UNDER FRONT AND REAR RADIUS RODS
2"
1/2
3"
DRUM DISC
"U" BRACKET DETAIL REAR SPRING
1/2" X 2" STEEL STRAP TELESCOPED AND WELDED AS SHOWN
DRILL 5/8" HOLES
3/4"
13"
33"
3 1/2"
3"
37"
39"
REAR RADIUS ROD DETAIL
FRAME
21"
3"
5"
2 1/2"
BRACKET PLATE
FRONT RADIUS ROD DETAIL
24 1/2"
AXLE
MAKE ALL RODS FROM MODEL "A" FORD RADIUS RODS

Immediately above are shown the dimensions of the front and rear radius rod installations. These are all made from Ford model "A" radius rods.

The front axle beam is a 1925 Overland four. It will be remembered this axle made use of spring perches similar to the Model T and A Fords. Perches used in this case are Model A Ford. The spring itself is a Model T Ford, flattened out. It is necessary

External Contracting Brakes Used for Simplicity and for Positive Action


MODEL "T" PORTION
BRONZE WELDED STEEL REENFORCEMENTS
FORWARD PORTION OF MODEL "A"
DETERMINED LENGTH AFTER MOTOR IS MOUNTED
DETAIL OF TORQUE TUBE
CLIP FOR HOLDING BAND
BAND
BRAKE LINING
RADIUS ROD I
DRUM ON WHEEL
ADJUST. NUT
DIRECTION OF PULL
SPRING
DETAIL ON BRAKE OPERATION
BRAKE BAND
GEAR SHIFT BALL
FASTEN TO FRAME PROPER
5/8" SPRING FASTENED TO UNDER SIDE OF SEAT
20"
3"
BRAKE CONTROL CABLES OF 1" FLEXIBLE 1/4 STRAND
ADJUSTABLE NUT ON EAR
DETAILS OF BRAKES AND CRANK
ADJUSTMENT PLATE RIVET TO DISC
"U" BRACKET
HOUSING
ADJUSTMENT EAR AND NUT
BRAKE BAND
RIVETS
1/4" BOLTS
RING FOR ADJUST.
DASH
DETAIL OF STEERING COLUMN BRACE

The torque tube, left, is made up from portions of both "T" and "A" tubes. Lower left shows the brake cross arms and cable lever. Steering column brace is necessary at dashboard.

This shows the way the brake band is toggled for smooth and positive action. Positive release is provided by the toggle.

to have the ends cut off and new eyes turned. Five leaves, in addition to the main, are used, these being tied together by means of friction tape and the "U" bolts, which clamp them to the special Z-bracket, which is necessary to support them in underslung position with reference to the front frame cross member. This bracket should be bent up from ½"x5"x16" steel plate with holes drilled to match the cross member and receive the U-bolts. Use a piece of steel plate 1½"x5"x½" as a filler block in the channel of the front cross member of the frame when mounting the spring.

Dodge Parts Used

The spindle bodies are 1925 Dodge while the king bolts are 1923 Dodge, as are also the bushings for the spindle bolts. The front hubs and bearings are 1925 Dodge fitted for the Dayton wire wheel. It will be noted that smaller tires are used on the front than on the rear, these being 18x4.50 heavy duty motorcycle tires. This is done in order to lighten the front end and get rid of any dangerous gyroscopic effect which may be set up at high speeds.

The tie rod used is 1925 Dodge. The amount of caster provided is 5 degrees, while the toe-in is zero. The camber of the right wheel is zero—that is, the wheel on a level floor sets perfectly vertical with reference to camber. The camber on the left wheel spindle is standard Dodge. The reason this design is used is to insure that the right wheel, when rounding the turns, will tend to dig in rather than slide over as would be the case if it were provided with a standard amount of camber.

The rivets are cut at the inner ends of the Model T rear axle housing tubes, where they are attached to the differential case. The brake housing and tube are rotated one-quarter turn forward and re-riveted to the differential case in that position. This provides for the underslinging at the rear. A special "U" shaped bracket is provided, this being bolted on to the spring mounting position of the left hand brake dust shield. Use a ⅝" bolt to fasten the U-bracket to the axle housing.

This "U" shaped bracket is drilled to receive the shackle bolt, the left side being mounted to the spring end without a shackle, the bolt being passed directly through the eye of the spring and the sides of the U-bracket. The right spring end is mounted with a conventional Ford Model T perch and shackle. In order to accommodate the Model T rear spring to this construction it is necessary to bend the ends of the spring. Model A Ford radius rods are used to provide the drive for the car and to keep the rear axle aligned. These are illustrated in the drawing and it will be noted that the forward end of the radius rod has been flattened and is bolted to the frame side member.

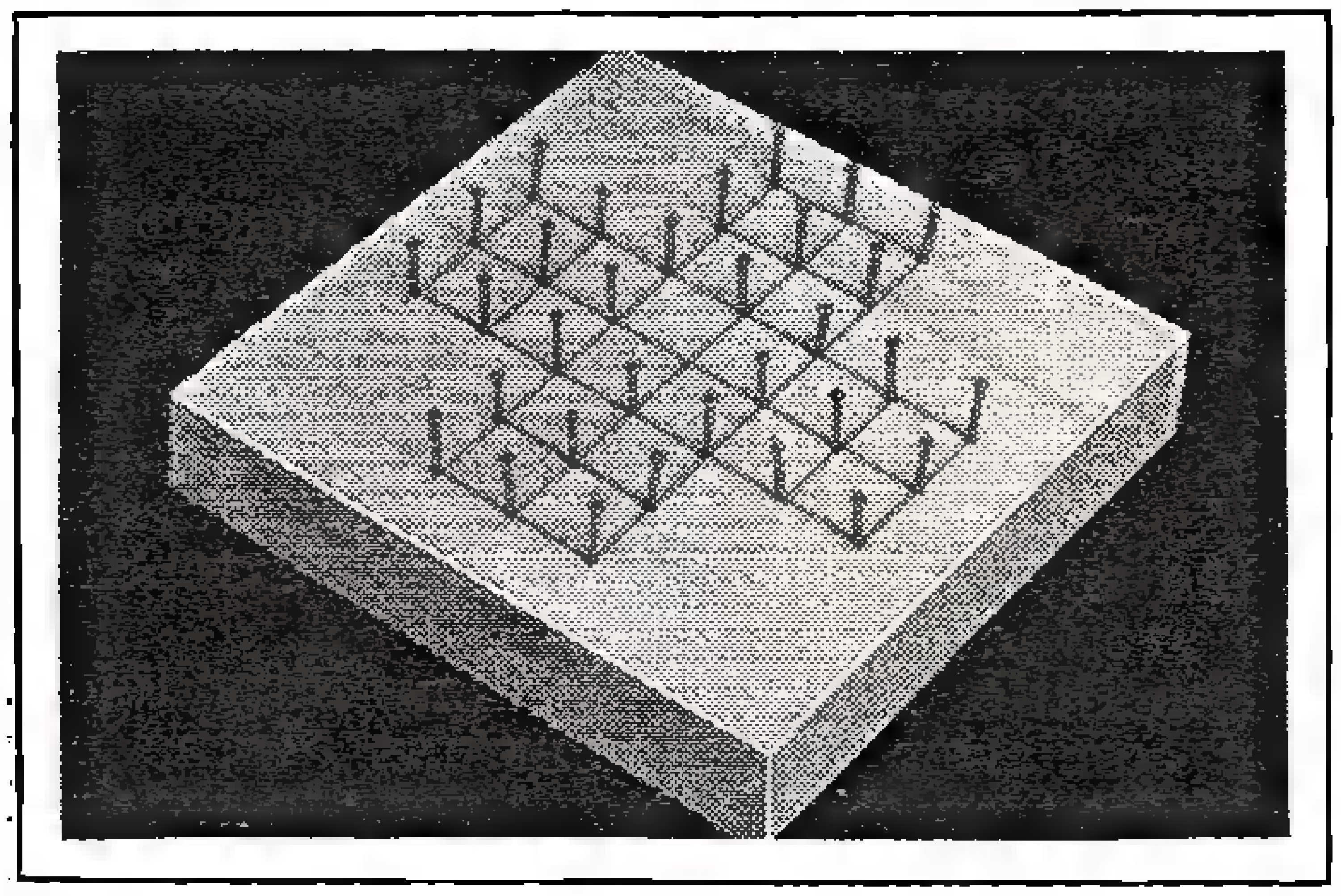
Two Gear Ratios

The gear ratio used is 11 - 40 on the mile track and 9 - 40 on the half-mile track. Special pinion gears are used so that the ring gear need not be changed for different tracks. The rear section of the torque tube is Model T, while the forward section is Model A torque tube. The propeller shaft is a Model T, fitted at the front end for a Model A universal and at the rear end for a Model T pinion. A special ball bearing thrust is provided at the front of the propeller shaft to keep it from floating rearward. These thrust bearings are variously used in automobiles and can be found in salvage shops.

Two hardened steel grooved washers receive the balls between them. Naturally it is necessary to calculate the desired length of the tube and shaft after the engine has

(Continued on page 28)

Two Simple PUZZLES That Are "Stickers"



The object of the cross peg puzzle is to jump the nails off the board after the manner of playing checkers, and to end up with only one nail on the board and have that nail right in the center, at hole No. 17 (see diagram).

THE "cross" puzzle, as shown by the photo and drawing, is very easy to make. Yet it can be worked in only one way, and it will tax your wits every time.

Take a ¾" block and lay out a cross three inches long and one inch wide. At half-inch intervals all the way along its face drill small holes to accommodate some light nails. These nails are put into each of the holes except the center one. The idea of the puzzle is to jump a nail over another to an empty hole (after the manner of jumping a man at checkers) and end up with only one nail on the board, and have that nail in the center. The solution is given in the table to the right.

As to rules, there are none, except that only one nail at a time may be jumped, and that as soon as a nail is jumped it must be removed from the board. Usually you will find yourself with only two nails left, and those two too far apart to be jumped, let alone end up in the center.

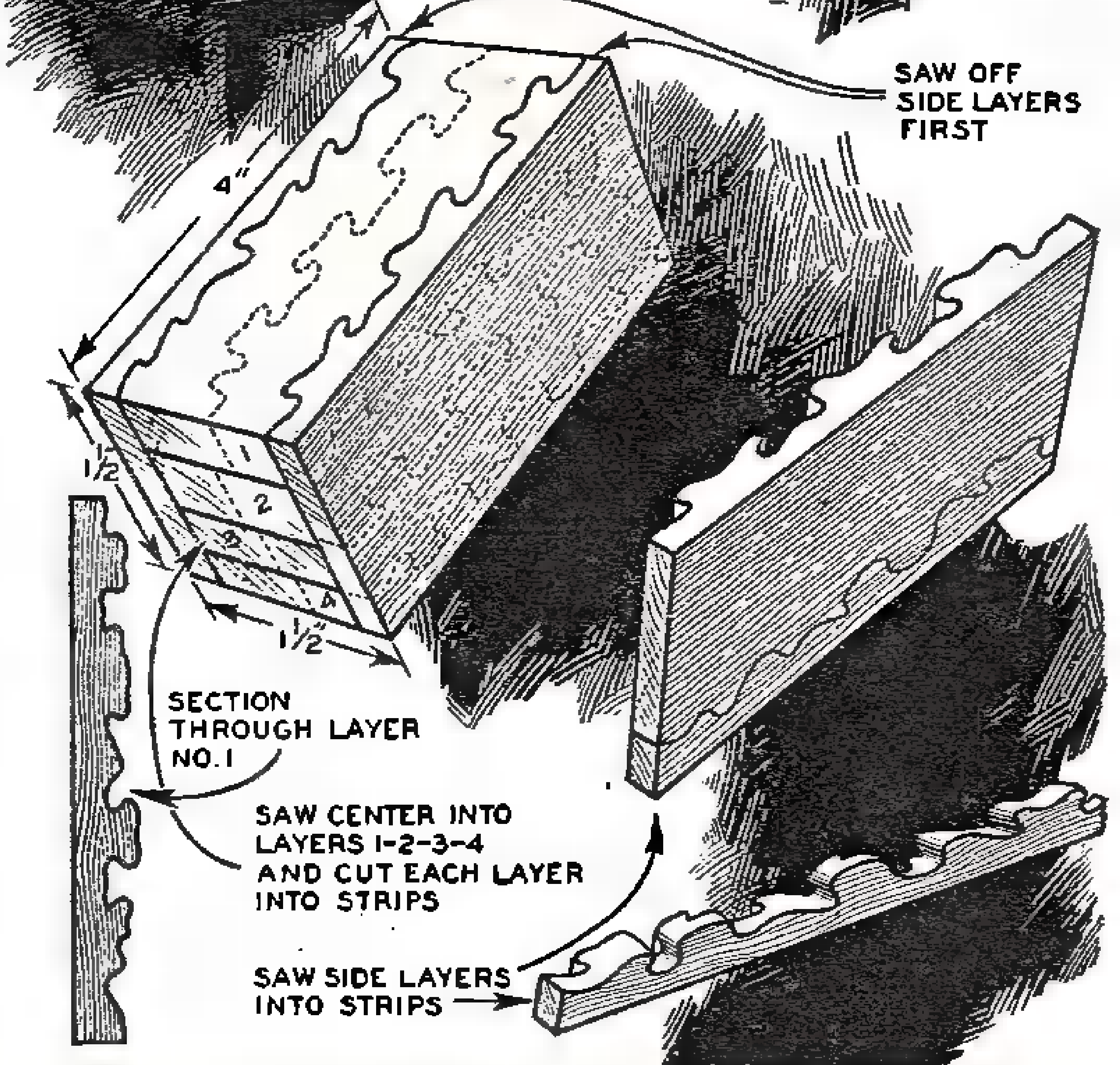
The second puzzle is a "jigstick"—a new version of jig saw puzzles. There is the same satisfaction in putting one together that there is with a jig saw of the flat variety.

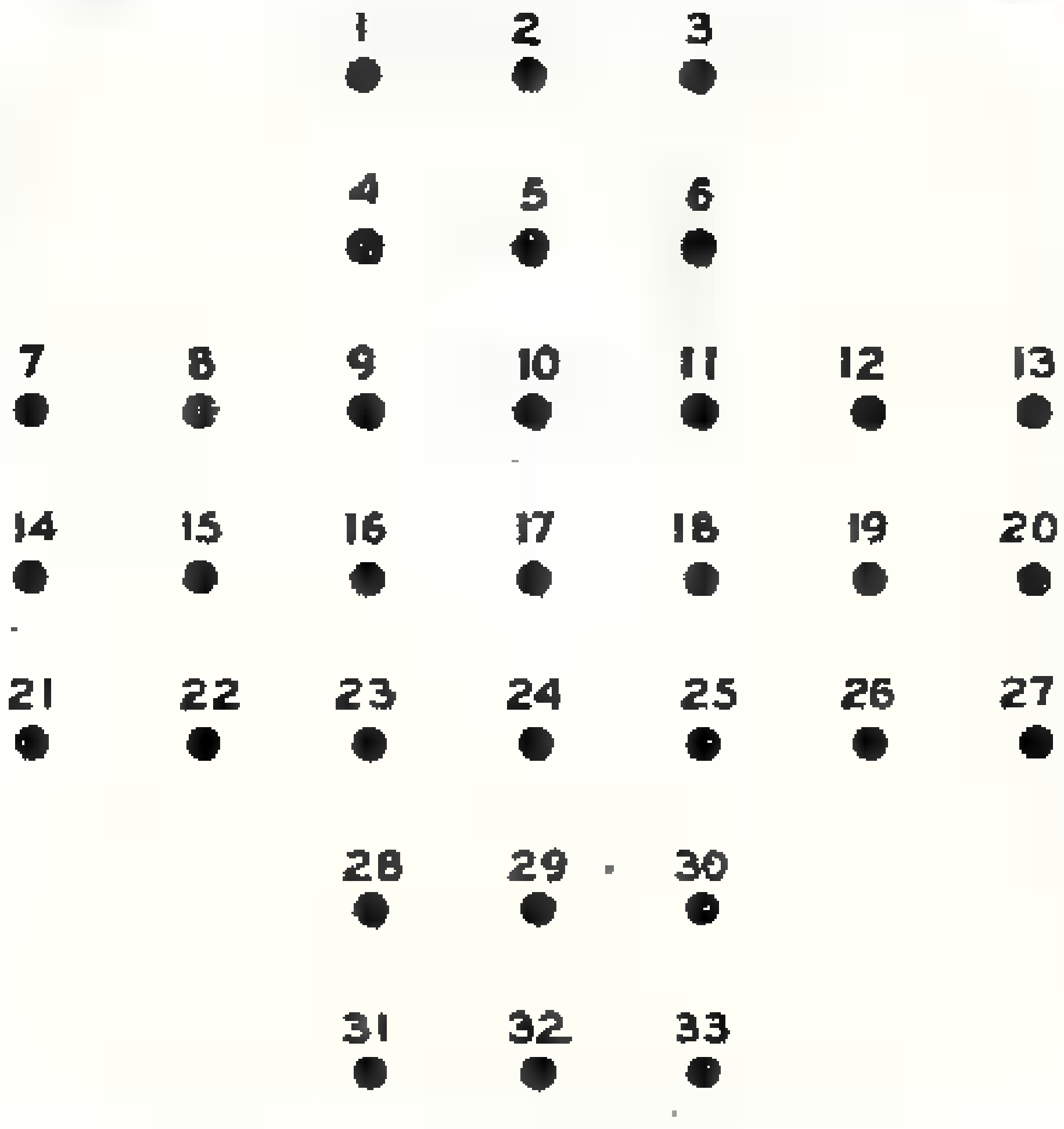
Take a block of pine about 2"x2" by 3" long. It must be soft to saw well, as this is a rather thick piece for the little saw blade to handle. Saw off a layer on either side.

Then as with a jig saw puzzle, saw off the sides into more strips.

Then take the center and saw it up some more. As long as progressive slabs are themselves in turn sawed to intricate pieces, you can evolve as tough a puzzle as you care to.

An interesting variation is to take miniature pictures and paste them on the faces of the puzzle. This will give you a four-sided jig saw puzzle with some intricate "meat" in its interior.

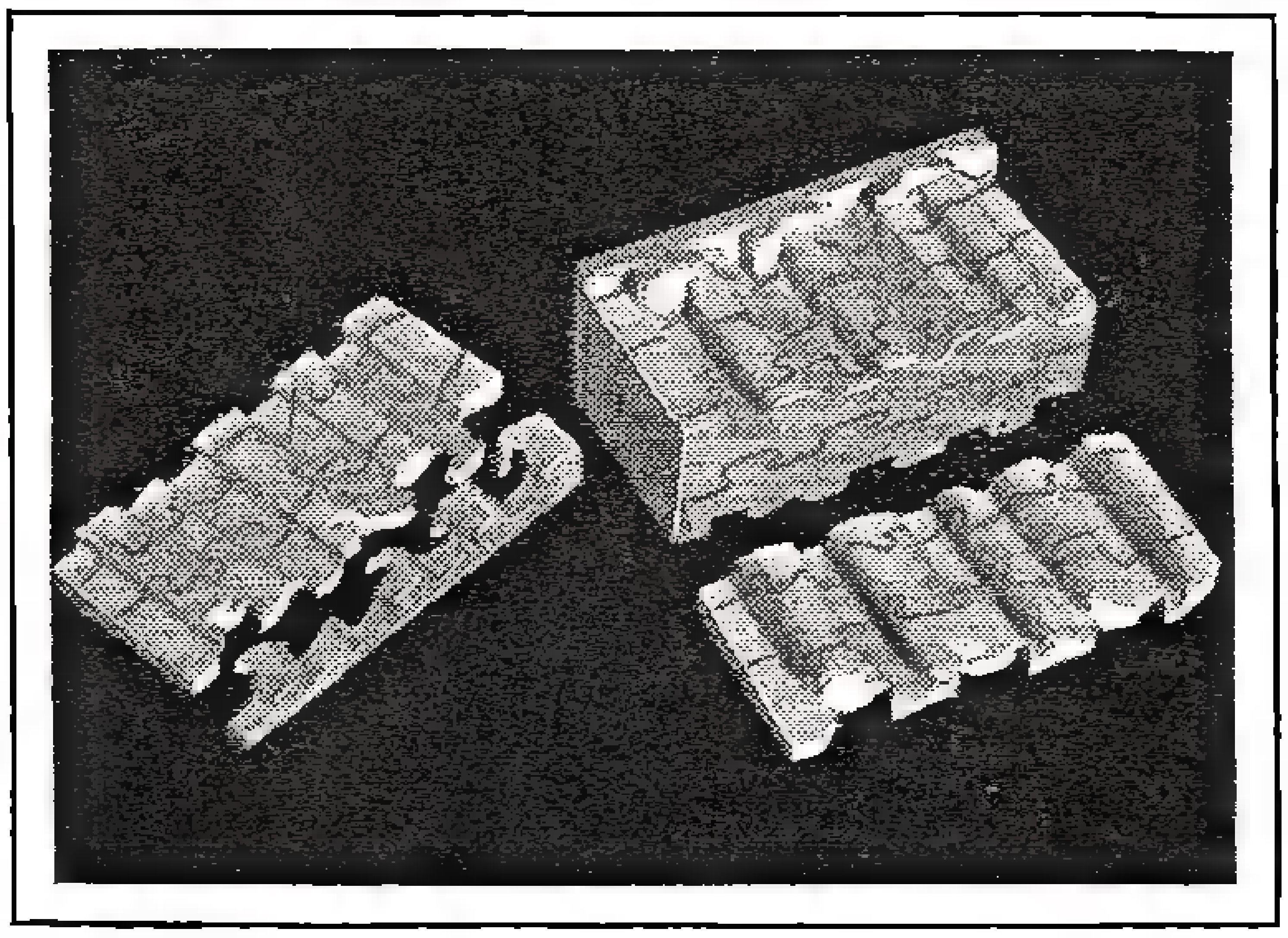

SAW OFF SIDE LAYERS FIRST
4"
½"
1
2
3
4
½"
SECTION THROUGH LAYER NO. 1
SAW CENTER INTO LAYERS 1-2-3-4 AND CUT EACH LAYER INTO STRIPS
SAW SIDE LAYERS INTO STRIPS



READ DOWN

5-10	1-2	30-25
12-11	18-11	11-18
3-6	3-6	4-9
10-11	24-23	16-23
13-12	31-28	28-29
8-9	33-32	20-19
22-15	16-23	17-18
7-8	31-28	30-25
21-14	22-23	19-18
10-9	25-24	
7-8	27-26	

Above is shown the manner of sawing a jigstick puzzle. Below, diagram of order of jumps to work cross peg puzzle.



How a jigstick puzzle looks when being put together.

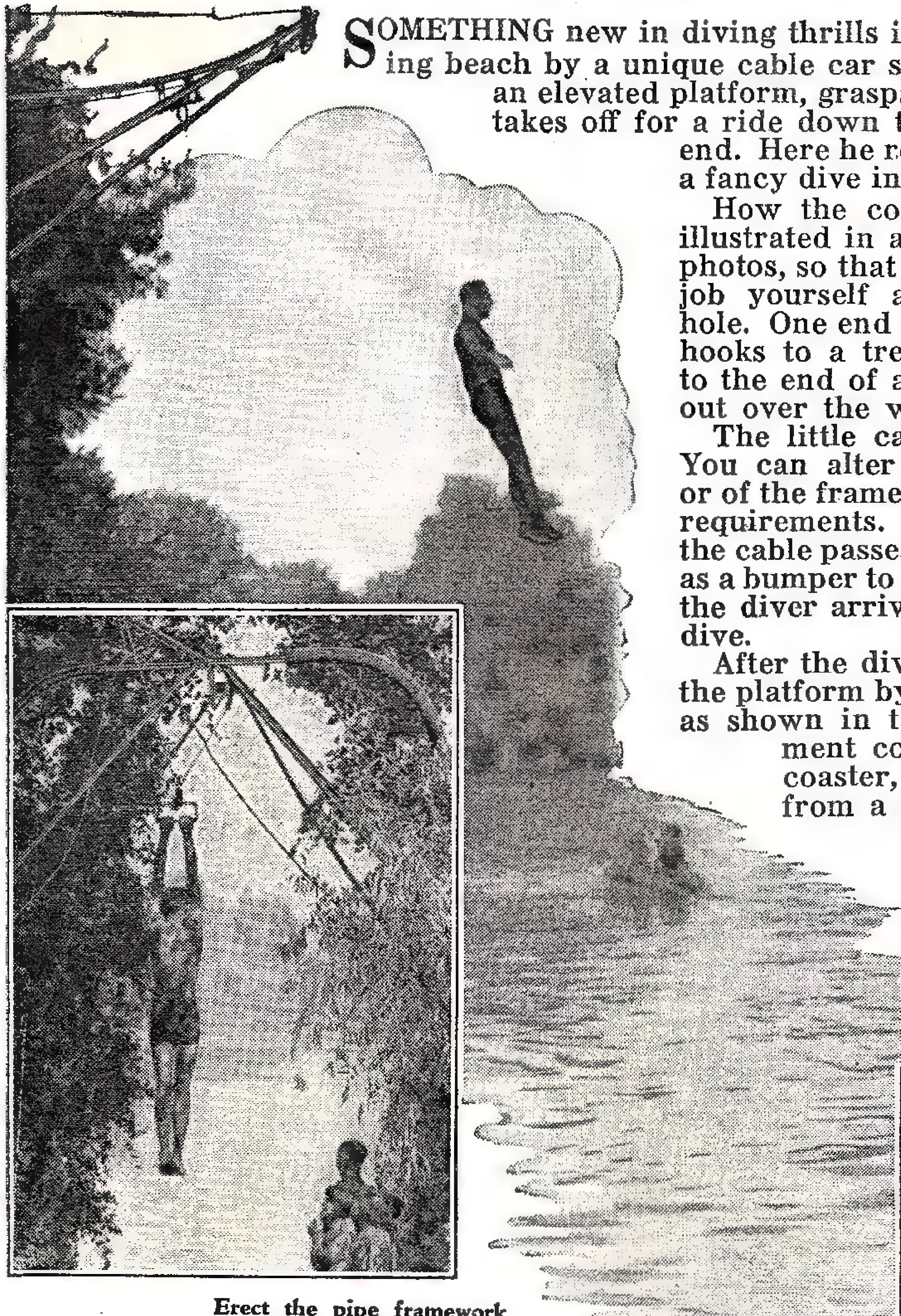
Here's Something New in Diving Thrills

SOMETHING new in diving thrills is provided at an Ohio bathing beach by a unique cable car system. The diver climbs to an elevated platform, grasps a two wheel cable car, and takes off for a ride down the line till he comes to the end. Here he releases his grip and executes a fancy dive into the water.

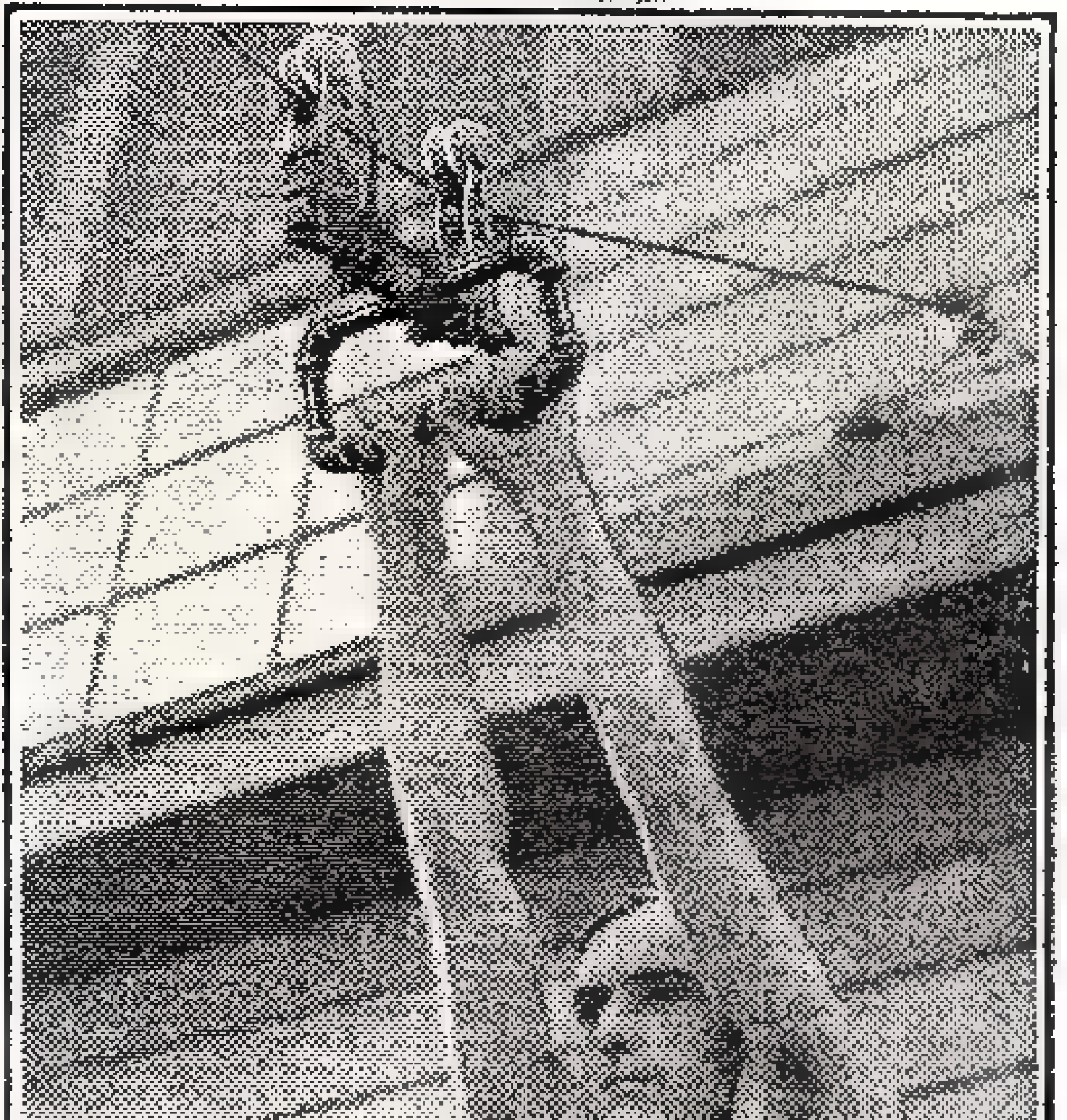
How the contrivance is constructed is illustrated in accompanying drawings and photos, so that you can easily duplicate the job yourself at your favorite swimming hole. One end of the cable, you will notice, hooks to a tree, while the other attaches to the end of a pipe framework extending out over the water.

The little cable car is simplicity itself. You can alter the dimensions of the car or of the framework to suit your individual requirements. Note that the beach end of the cable passes through a spring. This acts as a bumper to prevent violent shocks when the diver arrives at the end, ready for the dive.

After the dive, the car is hauled back to the platform by means of the cord attached as shown in the drawings. The arrangement combines the thrills of roller coaster, airplane, and high-diving from a catapult!

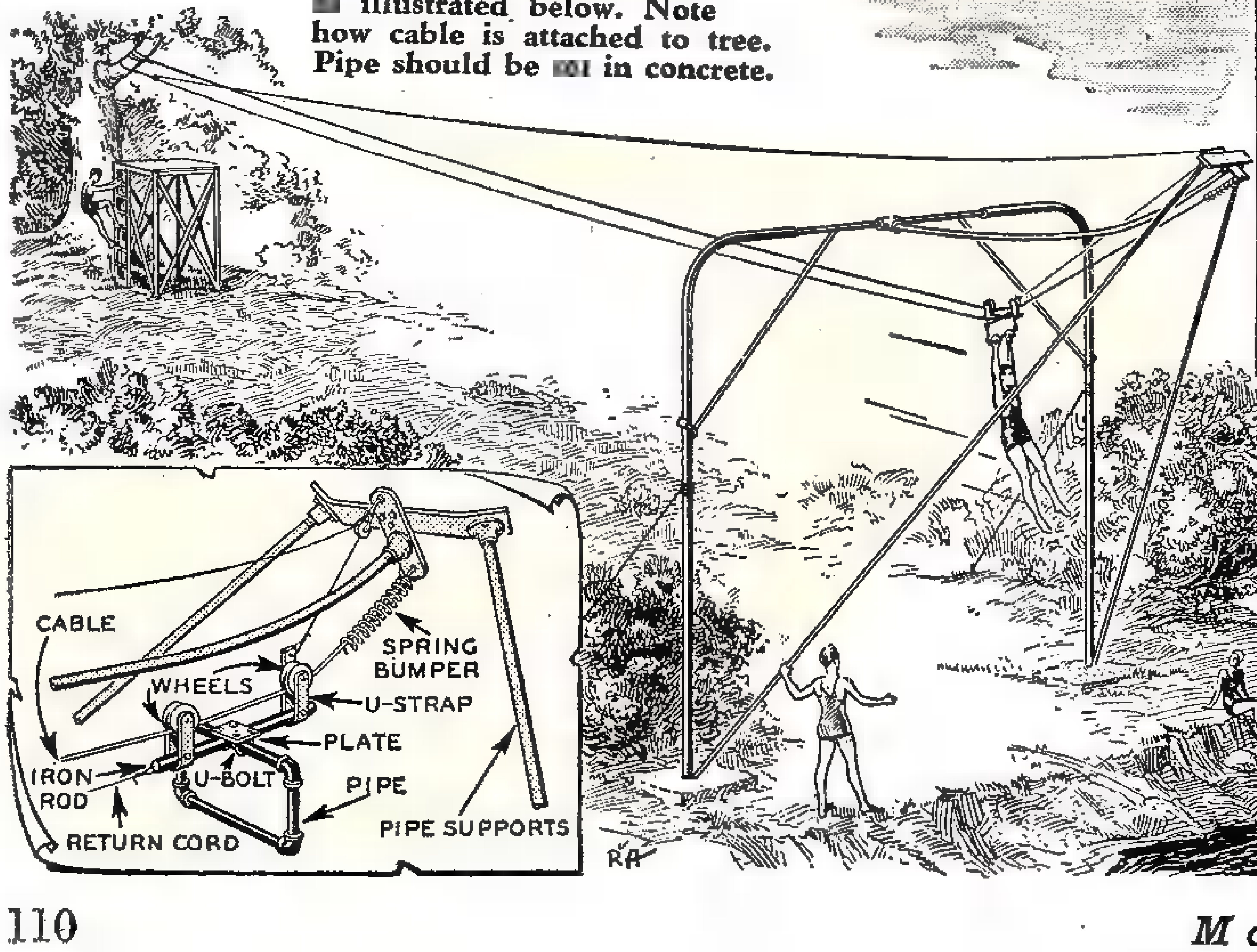


How the diver is catapulted out into the water is illustrated in photo at top, left. In insert at left is seen a swimmer hanging onto the cable car while he speeds down the line for a dive.



Swimmer grasping the cable car handle ready to take off for a thrilling plunge into the water.

Erect the pipe framework as illustrated below. Note how cable is attached to tree. Pipe should be set in concrete.



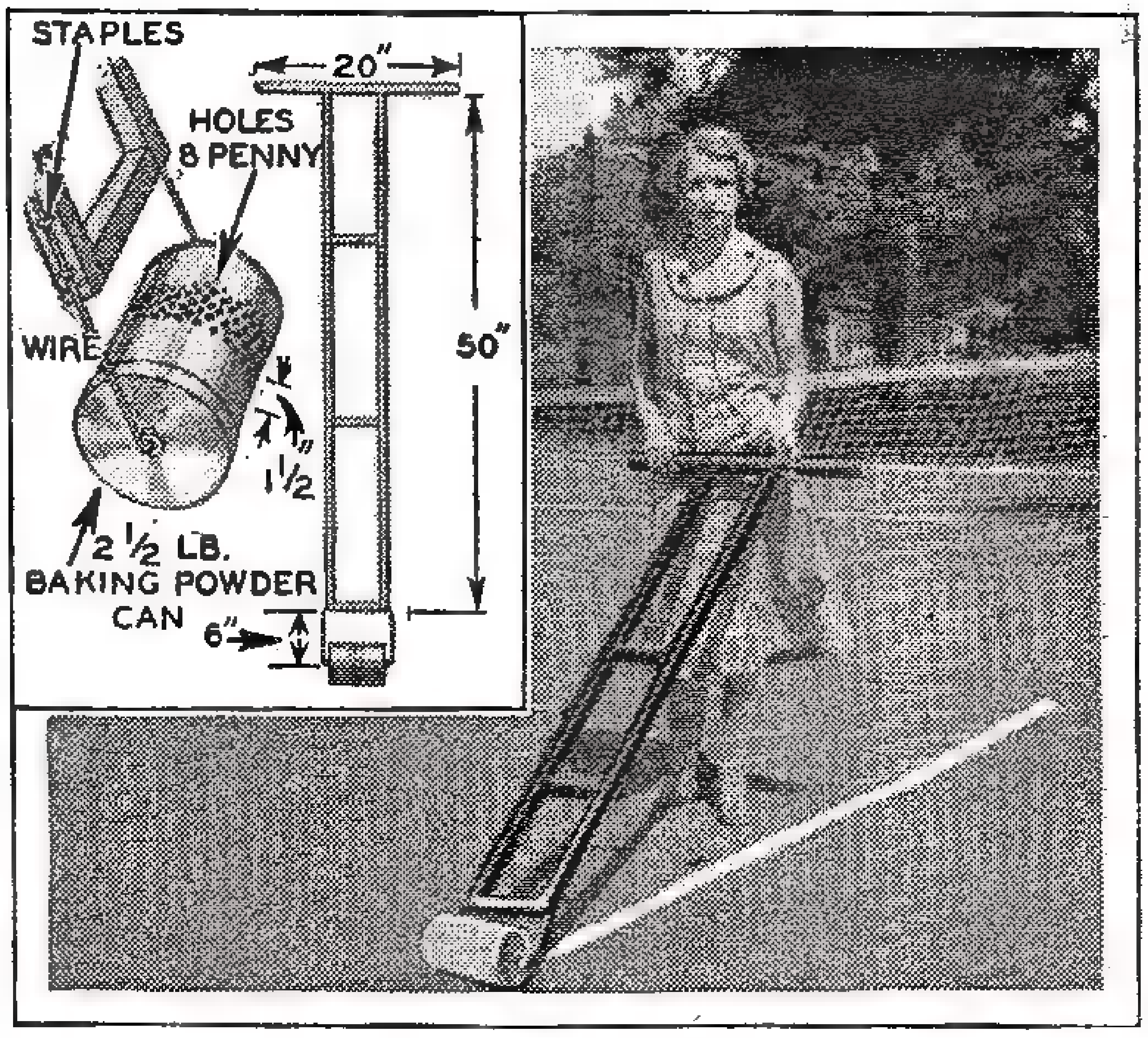
Tennis Court Marker Makes Straight, Clean-cut Lines

ALMOST any junk heap will furnish materials for making this efficient tennis court marker. The lime container is a 2-lb. baking powder can or a 1-lb. coffee can, with a good lid.

In the middle of each end punch a hole with a 12-penny nail, then with a pencil mark off a strip 1½ in. wide around the middle circumference of the can, and with an 8-penny nail punch this section full of holes, spacing them about ⅓ in. apart in every direction.

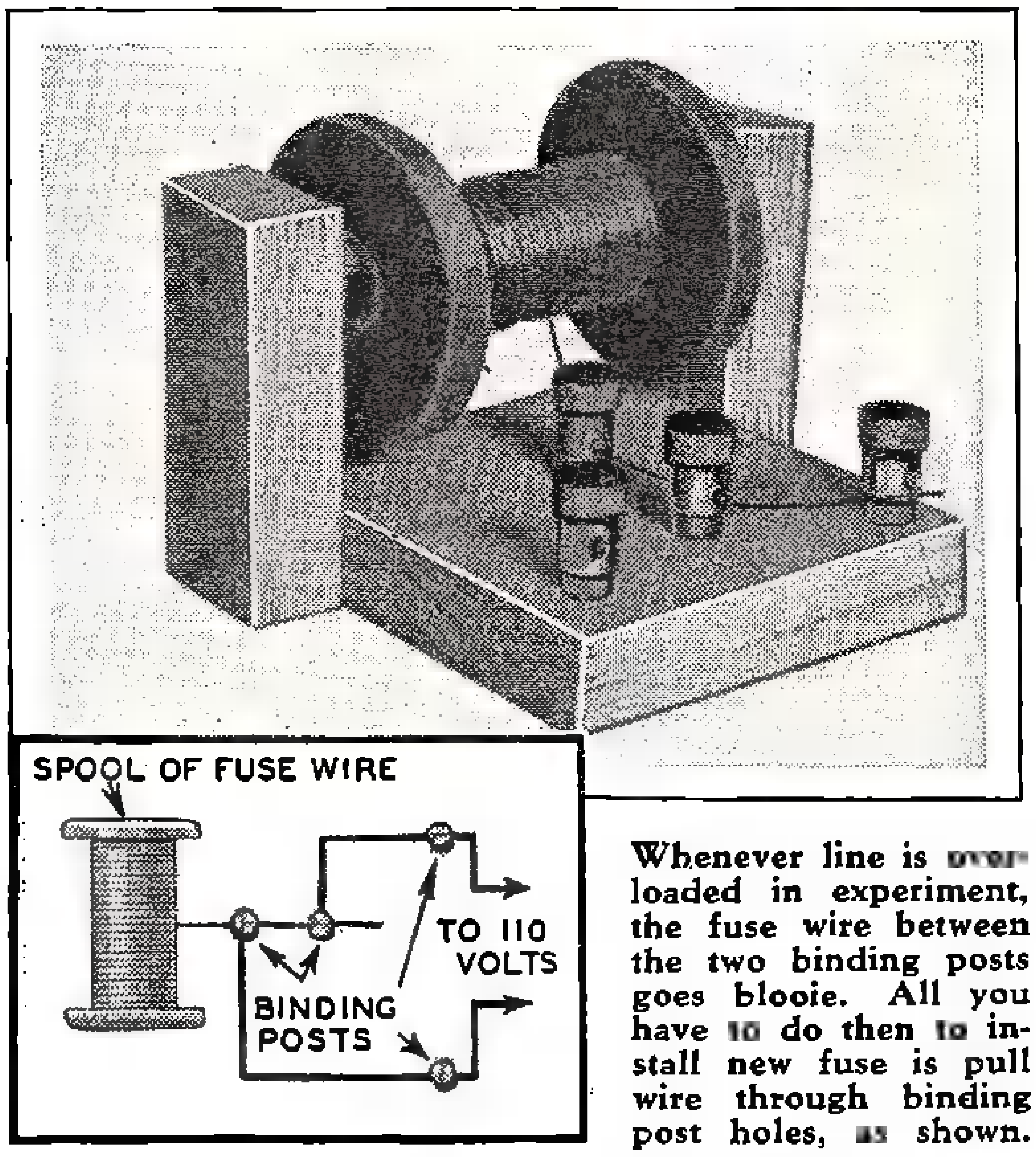
The frame may be made from any kind of lumber, cut to the dimensions shown in the drawing. The three cross-pieces are 4½ in. long. Two 18 in. pieces of stiff wire are fastened with wire staples to the outside of the framework so that their ends come down 6 in. to fit in the holes of the can.

In use the can is filled half full of air-slaked lime and the lid is placed on. The two wires are pulled back slightly and the can is forced between them. The marker is then pushed over the court like a lawn mower, as accompanying photo shows.



Marker is assembled as illustrated in the drawing. Can is filled half full of air-slaked lime, free from lumps, and rolled over the court like a lawn mower, leaving straight line.

Continuous Fuse for Experiments



Whenever line is overloaded in experiment, the fuse wire between the two binding posts goes blooie. All you have to do then to install new fuse is pull wire through binding post holes, as shown.

IN CONDUCTING a series of rather dangerous experiments in which it was practically impossible to overcome a rather rapid occurrence of short circuits, the writer built the little arrangement shown above.

Here a piece of fuse wire is carried through the holes in two binding posts of the spring variety. When the fuse wire between the posts blows it is only necessary to run a fresh piece in place from the spool. Inasmuch as a pound of fuse wire may be bought very cheaply, this is a very inexpensive way of solving such a problem.

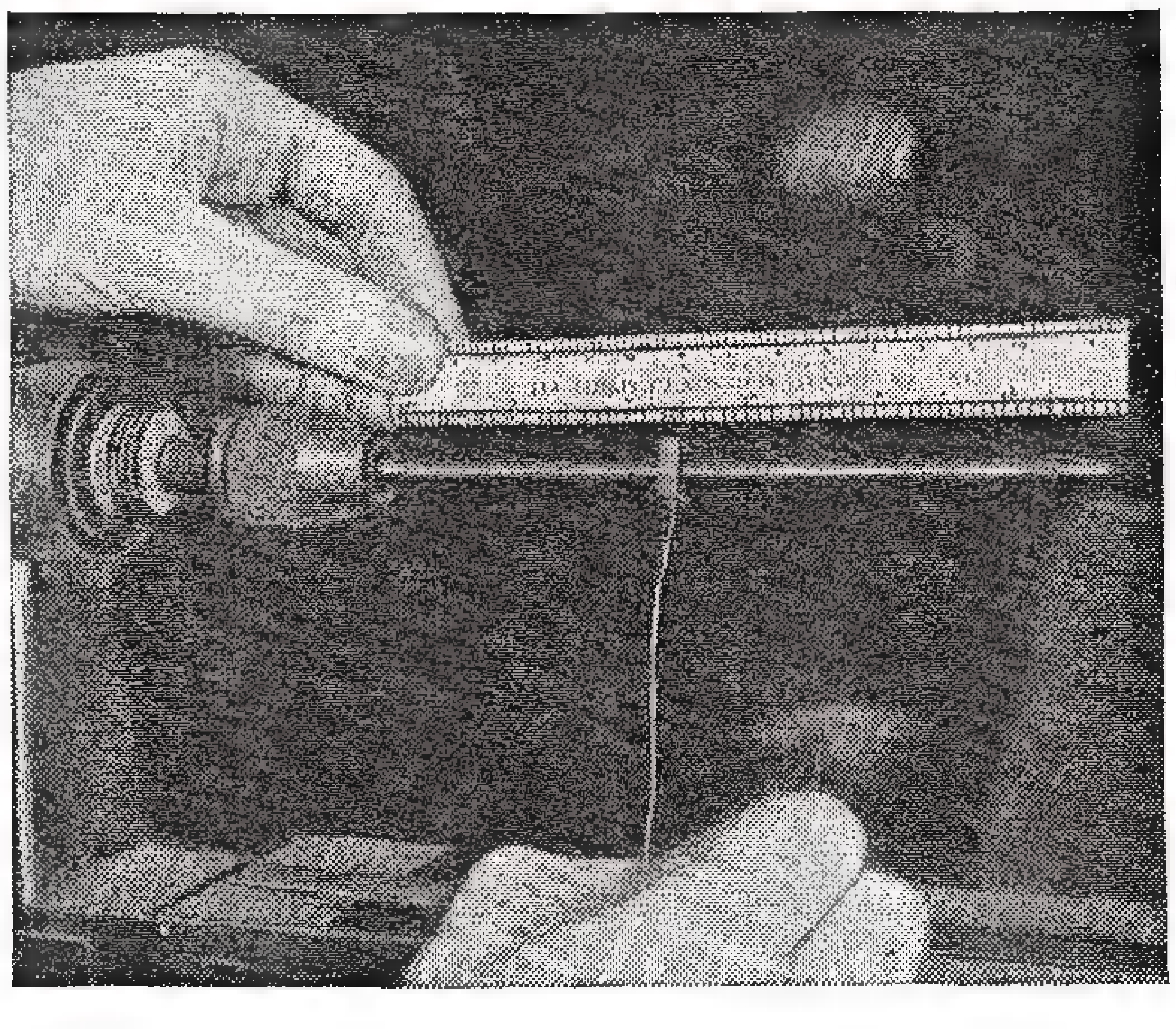
Improvised Motor Speed Indicator

NOT every mechanic has an expensive tachometer and yet many occasions arise where it is necessary to determine to at least a fair degree of accuracy the speed of a piece of machinery.

This may be done with a threaded rod, a nut and a ruler used in the manner depicted below. If the rod is threaded with an 8-32 die we know that the nut will advance one inch on the rod in thirty-two revolutions. If it advances five inches and by means of watching the second hand on a watch it is found that four seconds are required for the movement, a very simple calculation shows the speed of the machine.

Naturally this method has its limitations and it will be obvious that it could not be employed on real fast machinery.

It is advisable to use a thin-threaded rod for measuring speed of faster shafts.



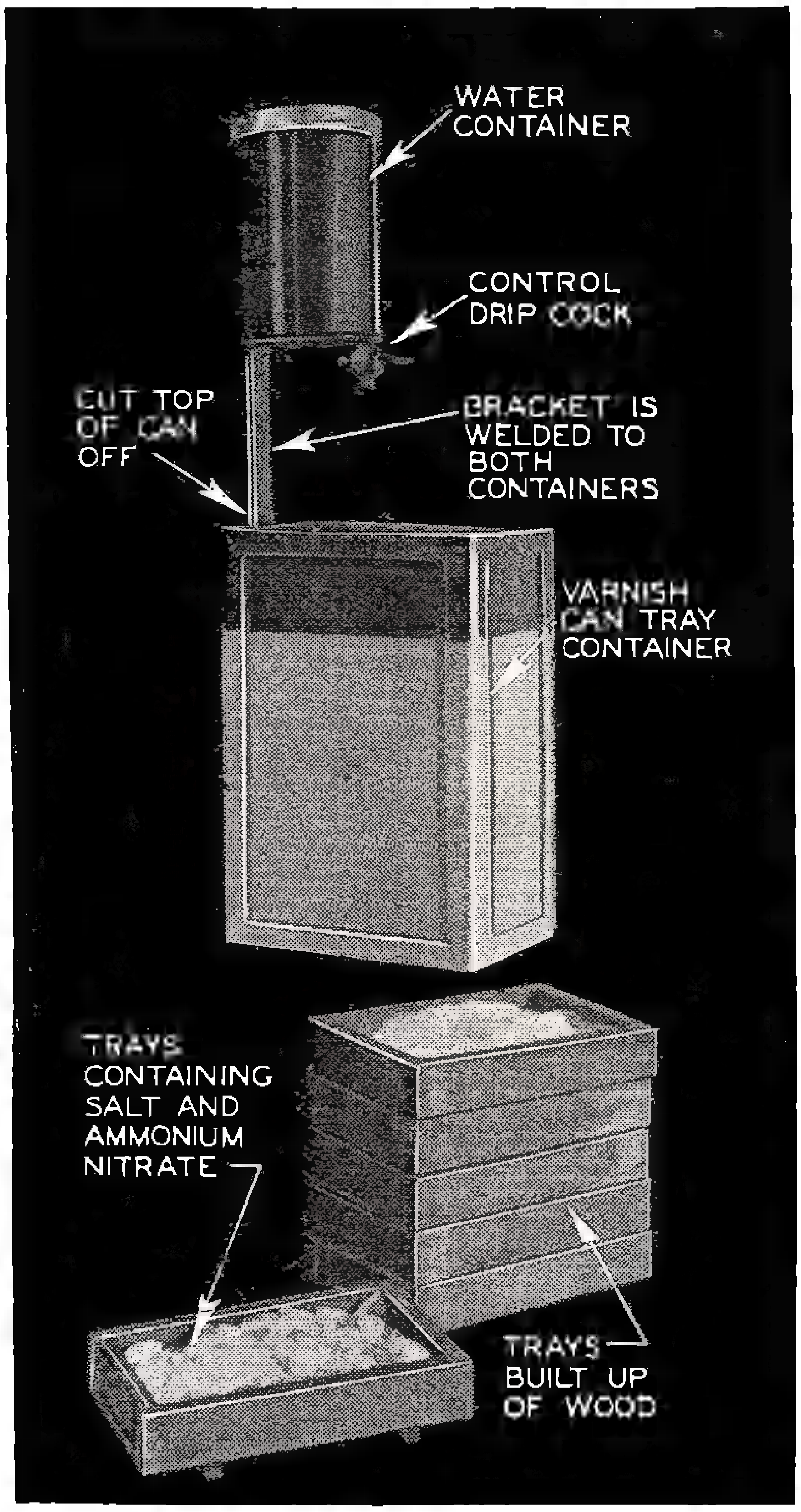
Speed is determined from calculations involving length the nut travels and the number of threads to inch on the rod. Time revolutions with stop watch for most accurate results.

HOW to BUILD a Simple

Here's an old schoolroom favorite—the cooler you used to see in physics class has been put to a practical experimental use by Mr. Cartright who shows how to build one of these simple affairs.

ICE boxes cool food because ice absorbs heat. As the ice melts, heat is required to raise its temperature to 32° F., the melting point.

If we build a box and insulate it from the heat of outside air currents, place ice in the box, and then place food in along with it to furnish heat to melt the ice, a balance is soon struck between the melting point of ice, which is always 32° F. and the temperature in the rest of the box. Generally this is around 50° F. We make provision to drain off the water from the ice tray, and presto, we have an ice box.


WATER CONTAINER
CONTROL DRIP COCK
CUT TOP OF CAN OFF
BRACKET IS WELDED TO BOTH CONTAINERS
VARNISH CAN TRAY CONTAINER
TRAYS CONTAINING SALT AND AMMONIUM NITRATE
TRAYS BUILT UP OF WOOD

A couple of cans, some trays impregnated with paraffin, and a supply of common salt mixed with ammonium nitrate constitute a fine ice box cooler for the summer camp.

Usually we think of the function of the ice box in reverse order. We think that we put food in to cool. But this is not so: there are several variations of the idea, looking at it from the standpoint of pure schoolroom physics.

For instance, there are machines which will cool an ice box quite as effectively as ice itself.

They work in somewhat the same fashion as ice. All of them are devices which allow gases to expand in "cooling coils." This expansion in the coils is accompanied by a much lowered temperature in the gas. Consequently the gas tends to soak up heat from the surrounding air, which in turn soaks up heat from the food in the box. As the gas travels through the coils it becomes warmed by the heat it has picked up, and it is carried (in mechanical types of refrigerators) to a compressor which squeezes the gas down again in volume. This also compresses the heat to a small space, and the gas is run through a cooling coil outside the refrigerator through which a blast of air is run by a fan to get rid of the heat. Then the gas is passed to a reservoir waiting to be admitted to the expansion coil again.

It is on the above principle that Frigidaire, G-E, and other mechanical refrigerators work.

Principles of Refrigeration

Chemical, gas, or absorption machines as they are called, do the compressing chemically, or by absorption of the gas into charcoal or other absorbent. While they need no pumps, there is a difference in pressures in the gases in the refrigerating system, and all such types must be of the sealed variety. That is, the refrigerating gas is sealed hermetically with the exclusion of air in a closed system of circulating pipes.

Both ice itself and these mechanical refrigerating machines operate on the same principle in an ice box. They soak up heat from the surrounding air and food. If we place food near them in a circulating space closed to outside air such as an ice box, we get an inverse result which is commonly thought of as the cooling of food. What really happens is the heating of the ice or the coil—a transfer which leaves the food in a lowered temperature.

There is still a third way for obtaining lowered temperature within an ice box that is ideally suited to the needs of the camper, the motorist or the summer resorter who is out of touch with the supply of ice.

This method is known as evaporative refrigeration, and I am going to tell you how

Chemical REFRIGERATOR

by JOHN CARTRIGHT

to build a refrigerating unit that needs no motors, needs no heating of a ball in a kerosene flame, and which needs no little gas pilot light to make it work. It is a refrigerator built on the old schoolroom chestnut—"heat of solution."

You know what happens when you put alcohol on your hand? Dries up right away, doesn't it? Feels cool too, eh? Or ether, which is even colder. Maybe you have seen canvas water bottles which cooled water because enough leaked through the bottle to keep the outside moist, and when the water evaporated it soaked up enough heat to leave the contents of the bottle cool.

Cooling by Evaporation

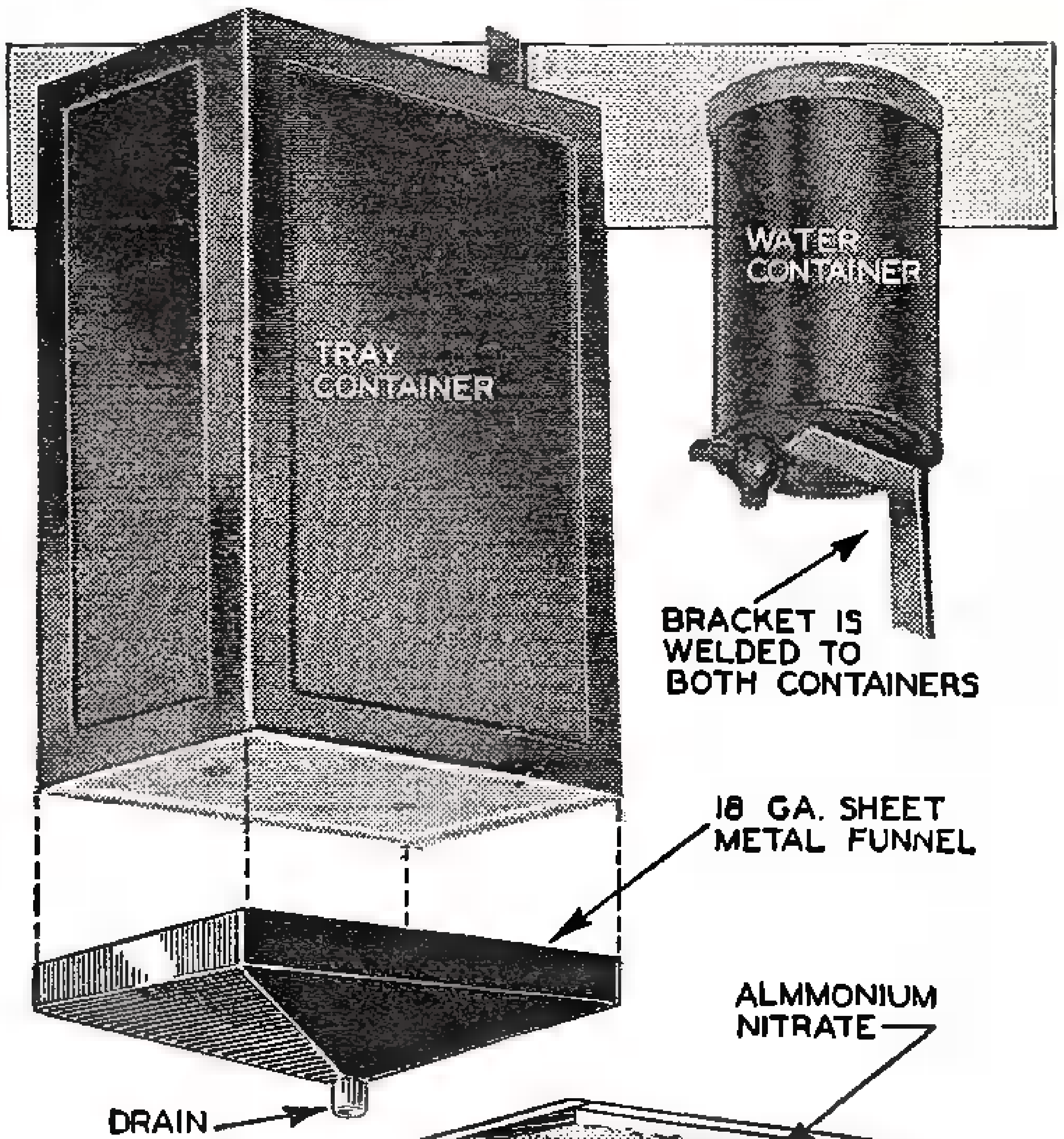
Now suppose we could make a unit that would take water drop by drop, absorb it, slightly change its chemical nature, and then evaporate it as though it were ether. We could have intense cold before very long, eh? Here's just such a rig. It might cost you all of two bucks to build, too!

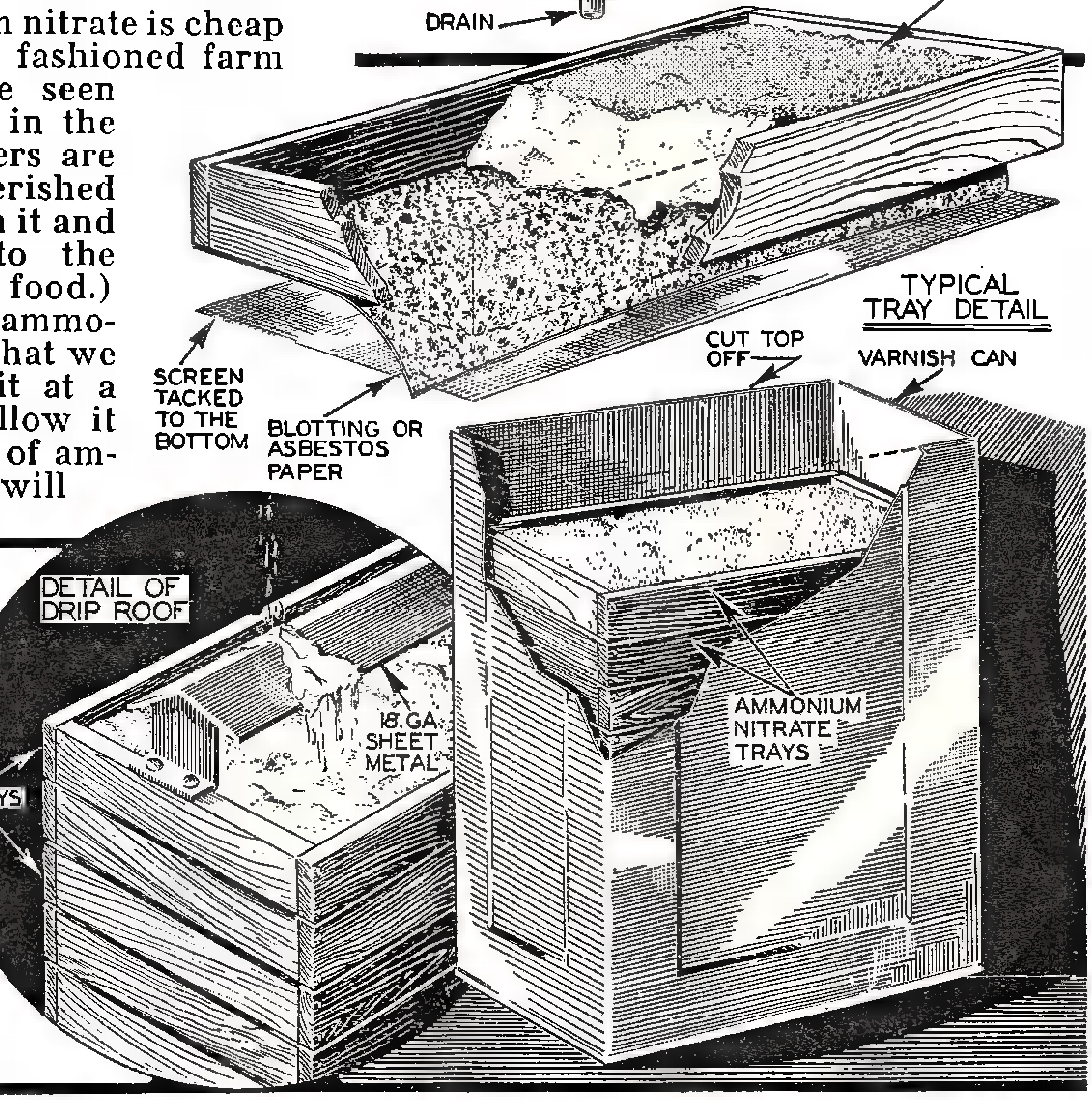
Every high school chemistry student knows that water dripping on ammonium nitrate will cause the nitrate to go into solution, and the resulting solution has a very low temperature and evaporates very rapidly.

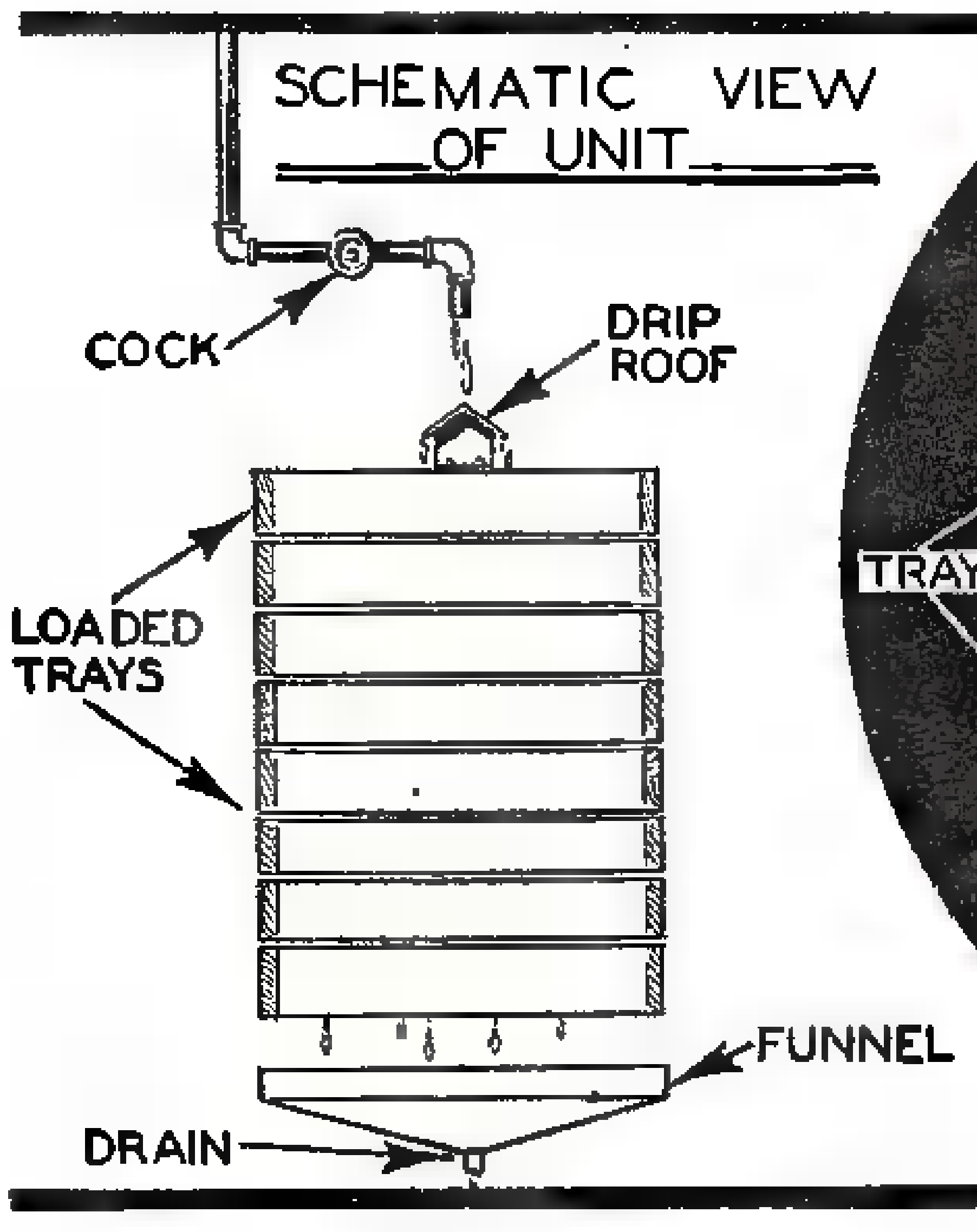
This chemical ammonium nitrate is cheap too—it is merely good old fashioned farm fertilizer. Perhaps you've seen piles of it along the road in the fall or spring when farmers are spreading it out on impoverished fields. (Rain soaks through it and carries the nitrogen into the ground. Nitrogen is plant food.)

Now if we take trays of ammonium nitrate, and fix it so that we can pass water through it at a rate just fast enough to allow it to make a normal solution of ammonium nitrate, which will immediately become cold, and then put in something which will keep the nitrate from crystallizing as it evaporates, we can put these trays in a metal box, arrange a drain, and have something nearly as good as a

(Continued on page 129)

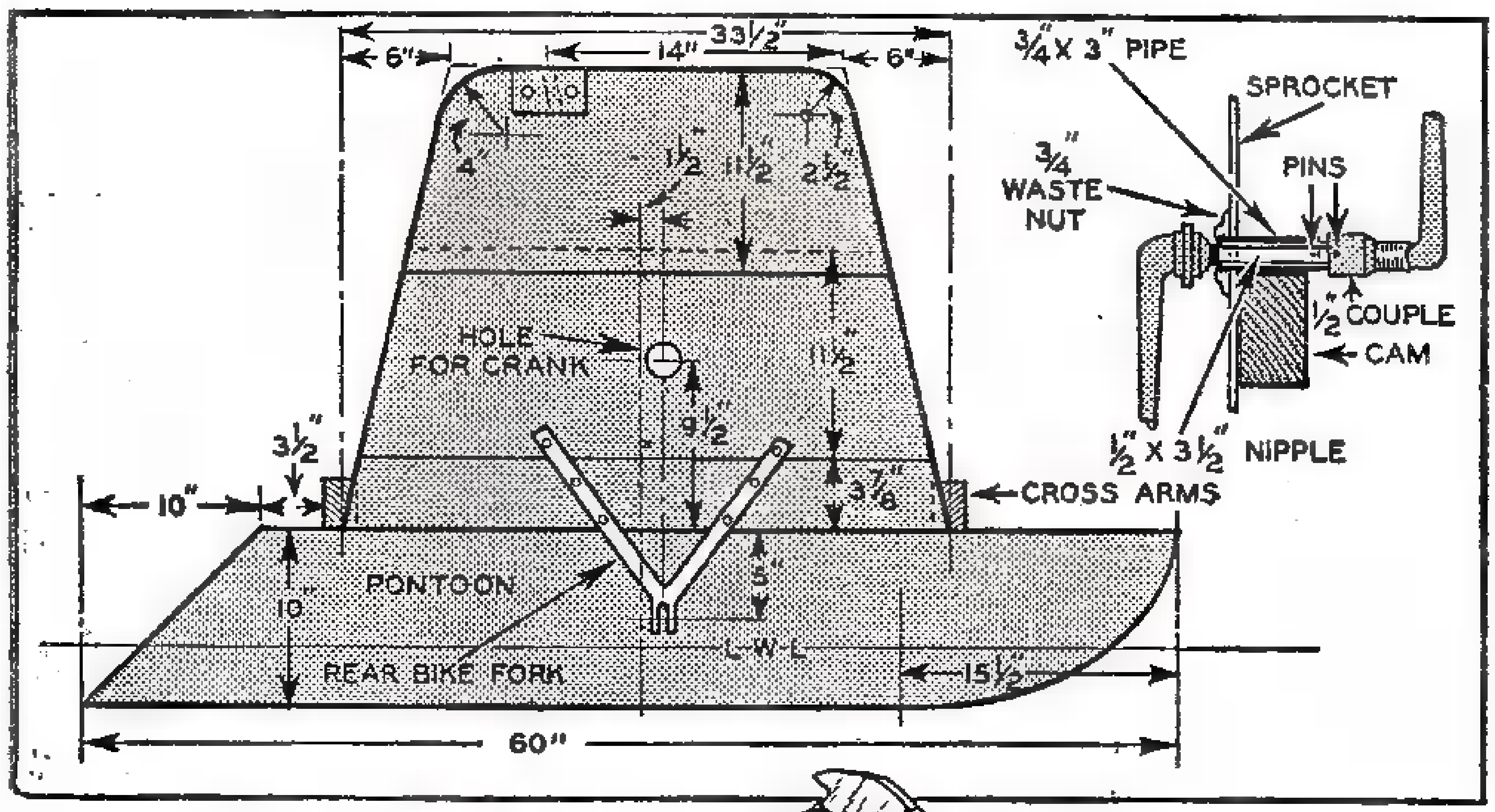

WATER CONTAINER
TRAY CONTAINER
BRACKET IS WELDED TO BOTH CONTAINERS
18 GA. SHEET METAL FUNNEL
DRAIN


ALMMONIUM NITRATE
TYPICAL TRAY DETAIL
SCREEN TACKED TO THE BOTTOM
BLOTTING OR ASBESTOS PAPER
CUT TOP OFF
VARNISH CAN
DETAIL OF DRIP ROOF
18 GA. SHEET METAL
TRAYS
AMMONIUM NITRATE TRAYS


SCHEMATIC VIEW OF UNIT
COCK
DRIP ROOF
LOADED TRAYS
FUNNEL
DRAIN

The drain must be used to pipe off the solution which results when the water drips onto the ammonium nitrate. A drip cock trickling water on a tin roof evenly distributes the water through the top tray, whence it filters to the others.

Ride this Wooden Seahorse 5 m.p.h.


6"
14"
33½"
6"
4"
1½
11½
2½
HOLE FOR CRANK
11½
9½
3½"
10"
3⅞
CROSS ARMS
PONTOON
10"
5"
L-W-L
REAR BIKE FORK
15½
60"
¾ x 3" PIPE
SPROCKET
¾" WASTE NUT
PINS
½" COUPLE
CAM
½" x 3½" NIPPLE

Side dimensions of the sea horse. Section through the bike sprocket shows how ¾x3 in. pipe connects cranks.

Five miles per hour is speed a good rider can make with this sea horse. Bike parts form the driving mechanism.

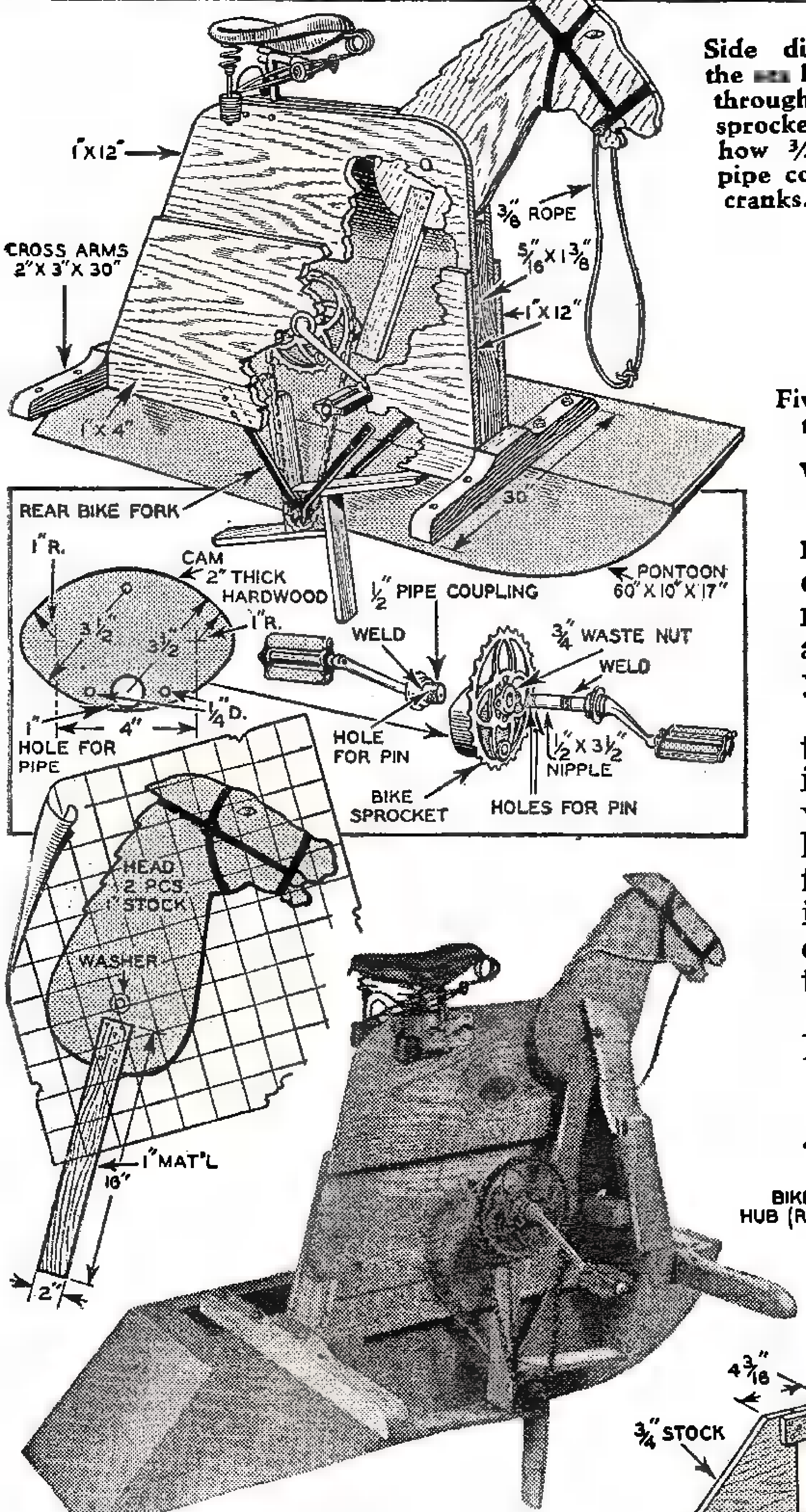

1"x12"
CROSS ARMS 2"x 3"x 30"
1"x 4"
⅜ ROPE
5⁄16"x 1⅜"
1"x 12"
30
PONTOON 60"x 10"x 17"
REAR BIKE FORK
1"R.
CAM 2" THICK HARDWOOD
1"R.
3½
3½
1"
4"
¼"D.
HOLE FOR PIPE
½" PIPE COUPLING
WELD
¾" WASTE NUT
WELD
HOLE FOR PIN
½"x 3½" NIPPLE
BIKE SPROCKET
HOLES FOR PIN
HEAD 2 PCS. 1" STOCK
WASHER
1" MAT'L
16"
2"

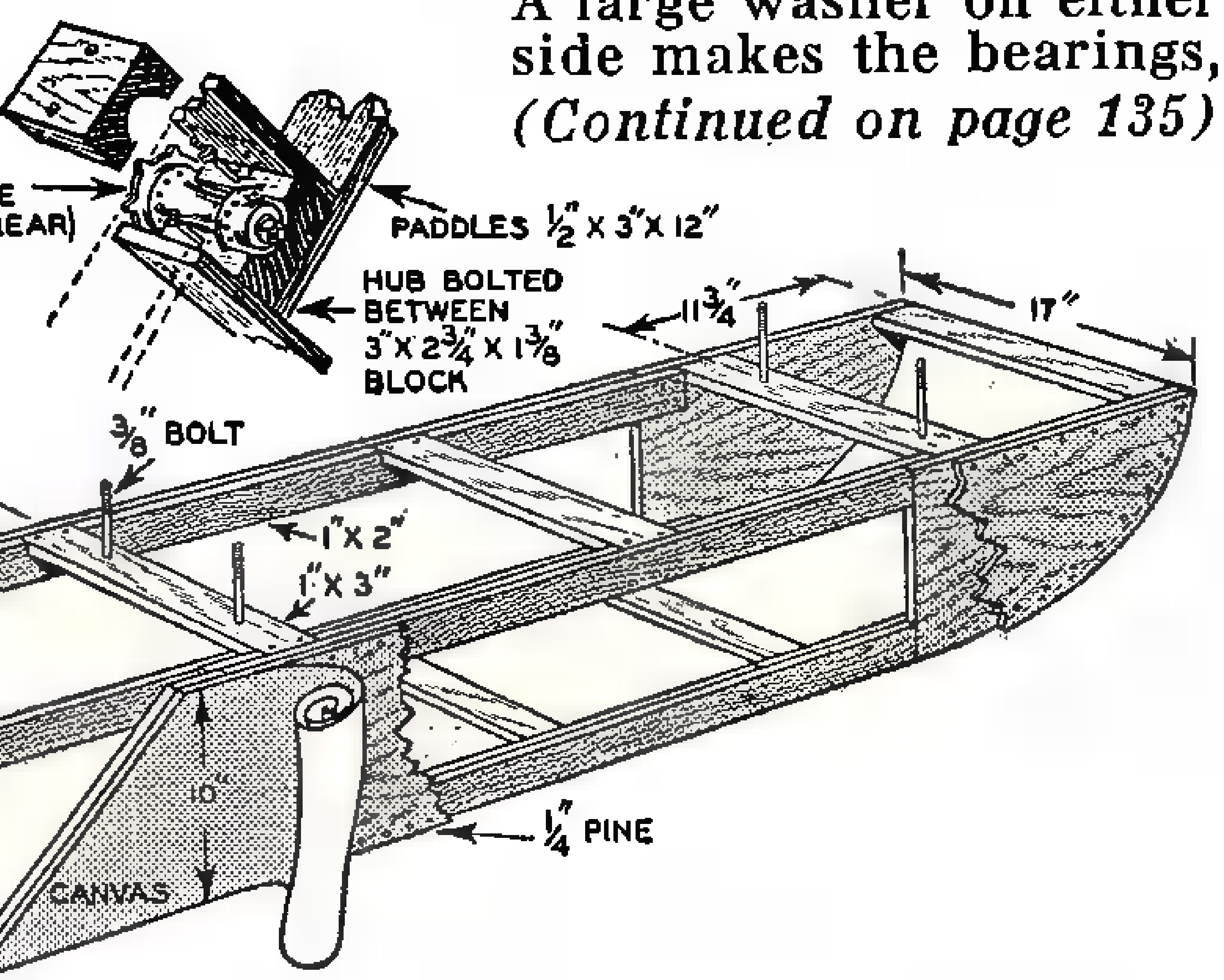
Photo above shows horse in cutaway view. Note how the bike fork takes the paddle wheel. Hard wood cam striking against the wood piece causes the head to bob like a real horse going on a gallop. Shape the head according to the squared chart shown in the drawing and attach ⅜" rope to halter. An old bike seat will serve as a saddle.

WHETHER you're ten years old or sixty years young, you're sure to like this novel water animal. Just watch that water churn as you gallop along at a good five miles per . . . see that head bobbing up and down . . . feel that easy roll beneath your body.

Start the construction by making the pontoons, following the accompanying drawing. Locate the two end cross pieces so they will line up with the cross arms on the horse. The ⅜-inch carriage bolts used for fastening are prevented from falling down into the pontoon by means of light straps of wood or metal nailed to the underside of the cross piece.

The horse's head is readily cut out on the band saw from two pieces of 1-inch stock. A large washer on either side makes the bearings,

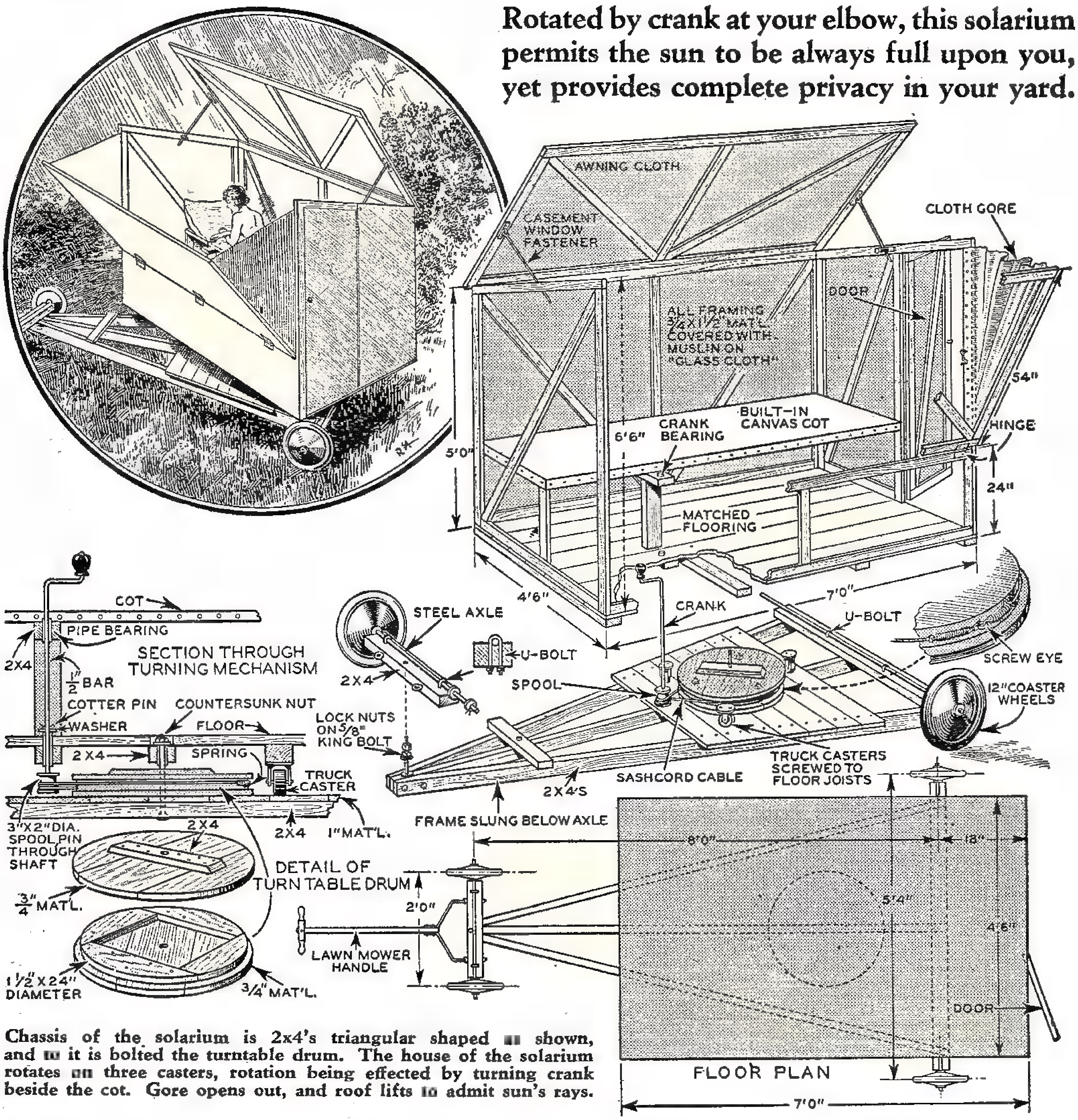
(Continued on page 135)


BIKE HUB (REAR)
PADDLES ½"x 3"x 12"
HUB BOLTED BETWEEN 3"x 2¾"x 1⅜" BLOCK
11¾"
17"
⅜" BOLT
4 3⁄16"
1"x 2"
1"x 3"
¾" STOCK
10"
¼" PINE
CANVAS

Framework of the pontoon is covered first with ¼" pine or with sheet metal, then with heavy canvas. Wood straps hold bolts in place.

Improve Your Health in Lawn Solarium

Rotated by crank at your elbow, this solarium permits the sun to be always full upon you, yet provides complete privacy in your yard.


AWNING CLOTH
CASEMENT WINDOW FASTENER
CLOTH GORE
DOOR
ALL FRAMING $3/4$X1$1/2$" MAT'L. COVERED WITH MUSLIN ON "GLASS CLOTH"
54"
HINGE
24"
BUILT-IN CANVAS COT
CRANK BEARING
6'6"
5'0"
MATCHED FLOORING
4'6"
7'0"
CRANK
U-BOLT
SCREW EYE
12" COASTER WHEELS
STEEL AXLE
U-BOLT
2X4
SPOOL
LOCK NUTS ON $5/8$" KING BOLT
TRUCK CASTERS SCREWED TO FLOOR JOISTS
SASHCORD CABLE
2X4'S
FRAME SLUNG BELOW AXLE
COT
PIPE BEARING
SECTION THROUGH TURNING MECHANISM
2X4
$\frac{1}{2}$" BAR
COTTER PIN
COUNTERSUNK NUT
WASHER
FLOOR
2 X4
SPRING
TRUCK CASTER
3"X2" DIA. SPOOL PIN THROUGH SHAFT
2X4
2X4
1" MAT'L.
DETAIL OF TURN TABLE DRUM
$\frac{3}{4}$" MAT'L.
1$1/2$"X24" DIAMETER
$3/4$" MAT'L.
2'0"
LAWN MOWER HANDLE
8'0"
18"
5'4"
4'6"
DOOR
FLOOR PLAN
7'0"

Chassis of the solarium is 2x4's triangular shaped as shown, and to it is bolted the turntable drum. The house of the solarium rotates on three casters, rotation being effected by turning crank beside the cot. Gore opens out, and roof lifts to admit sun's rays.

THOSE who have tried sun-bathing are enthusiastic over its benefits and many more would enjoy it except for the lack of suitable privacy in a sun-drenched area. Here is the design for a very complete solarium which will cover the requirements of the most exacting sun-bather.

It can be wheeled to the most desirable spot on the lawn, opened up to receive the full volume of the solar rays, and moreover kept toward the sun without the occupant rising from his couch. A small crank-handle in convenient reach is connected with a turntable and with a few turns almost a complete rotation of the solarium can be made.

Drawings above give general dimensions. One side opens out, with openings at the ends protected with cloth gores. The roof also can be raised to admit the full strength of the sun's rays. There is a built-in canvas cot with the rotating crank installed beside it.

The chassis is built on a triangular frame consisting of three two-by-fours with cross members as indicated.

In the center of the triangle a platform is built of 1 in. material, and a turntable drum bolts to it. This drum, therefore, is fixed on the chassis, while the solarium proper turns around it, riding on three substantial truck casters.

A sectional view of the turning mechanism is shown. A ⅝-in. carriage bolt serves as axis for the turntable. A wood spool secured to a vertical shaft by means of a pin carries two turns of the sash-cord cable, which encircles the large drum and is secured on the opposite or rear side to coil springs and a screweye.

Building a TELESCOPE for

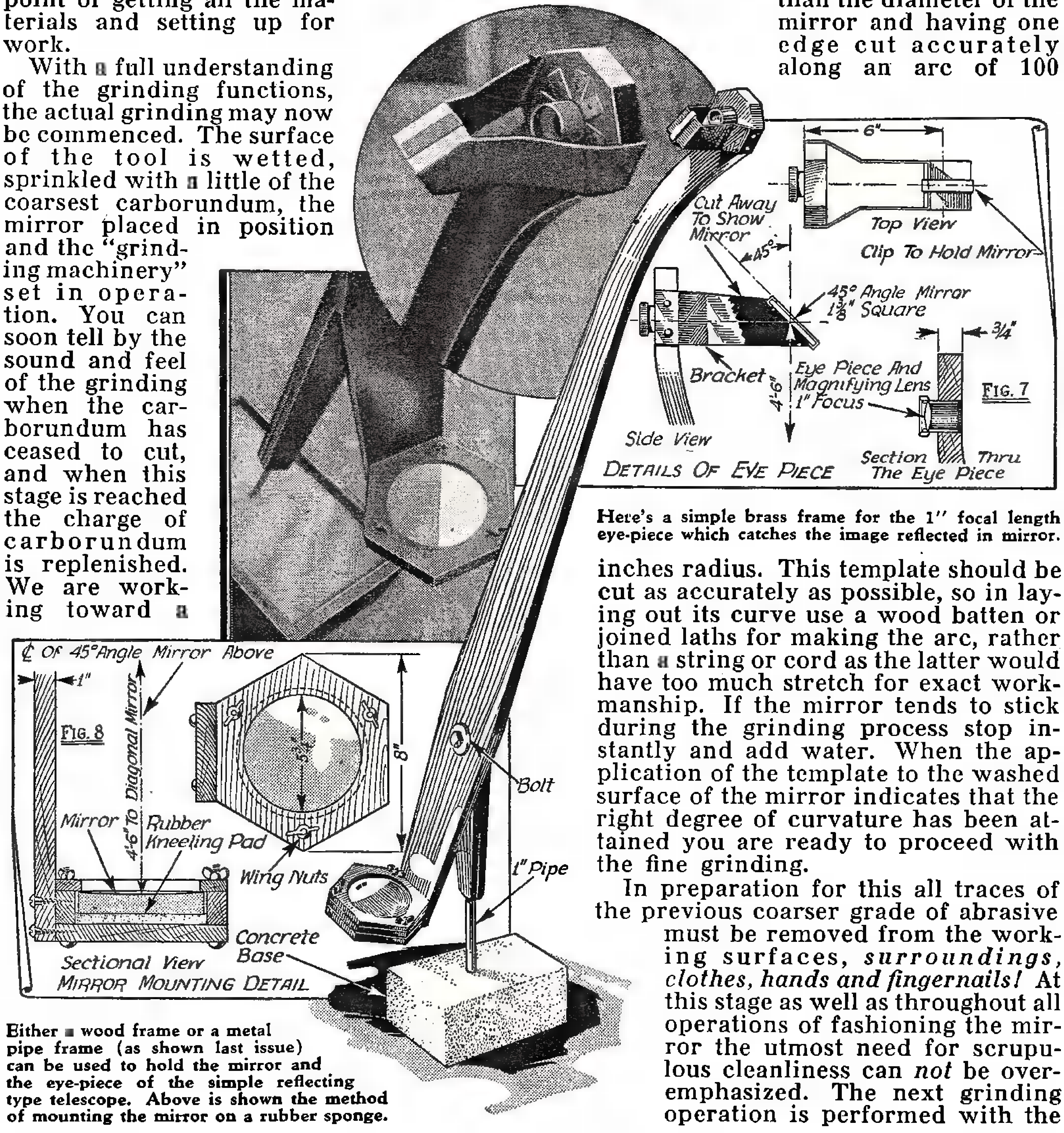
by E. WILLARD. PENNINGTON

In this article Mr. Pennington shows how to polish and mount the mirror for which grinding directions were given last issue. Also the simple Foucault test is thoroughly explained so you can have a mirror as accurate as the finest.

WE ARE describing the construction of reflecting telescopes, with particular emphasis on a 6" telescope which one can build himself. In the last issue we described the optical system, showed a frame, described the grinding of the lens up to the point of getting all the materials and setting up for work.

With a full understanding of the grinding functions, the actual grinding may now be commenced. The surface of the tool is wetted, sprinkled with a little of the coarsest carborundum, the mirror placed in position and the "grinding machinery" set in operation. You can soon tell by the sound and feel of the grinding when the carborundum has ceased to cut, and when this stage is reached the charge of carborundum is replenished. We are working toward a spherical reflector having a focal length of 50 inches and such a reflector has a *spherical radius* or center of curvature of 100 inches so in order to check the progress of the rough grinding it is necessary to provide a thin metal template a little longer than the diameter of the mirror and having one edge cut accurately along an arc of 100 inches radius. This template should be cut as accurately as possible, so in laying out its curve use a wood batten or joined laths for making the arc, rather than a string or cord as the latter would have too much stretch for exact workmanship. If the mirror tends to stick during the grinding process stop instantly and add water. When the application of the template to the washed surface of the mirror indicates that the right degree of curvature has been attained you are ready to proceed with the fine grinding.

In preparation for this all traces of the previous coarser grade of abrasive must be removed from the working surfaces, *surroundings, clothes, hands and fingernails!* At this stage as well as throughout all operations of fashioning the mirror the utmost need for scrupulous cleanliness can *not* be overemphasized. The next grinding operation is performed with the


6"
Top View
Clip To Hold Mirror
Cut Away To Show Mirror
45°
45° Angle Mirror 1⅛" Square
¾"
Bracket
4'6"
Eye Piece And Magnifying Lens 1" Focus
FIG. 7
Side View
Details Of Eye Piece
Section Thru The Eye Piece
℄ Of 45°Angle Mirror Above
1"
FIG. 8
4'6" To Diagonal Mirror
5¾"
8"
Mirror
Rubber Kneeling Pad
Wing Nuts
Bolt
1" Pipe
Concrete Base
Sectional View
Mirror Mounting Detail

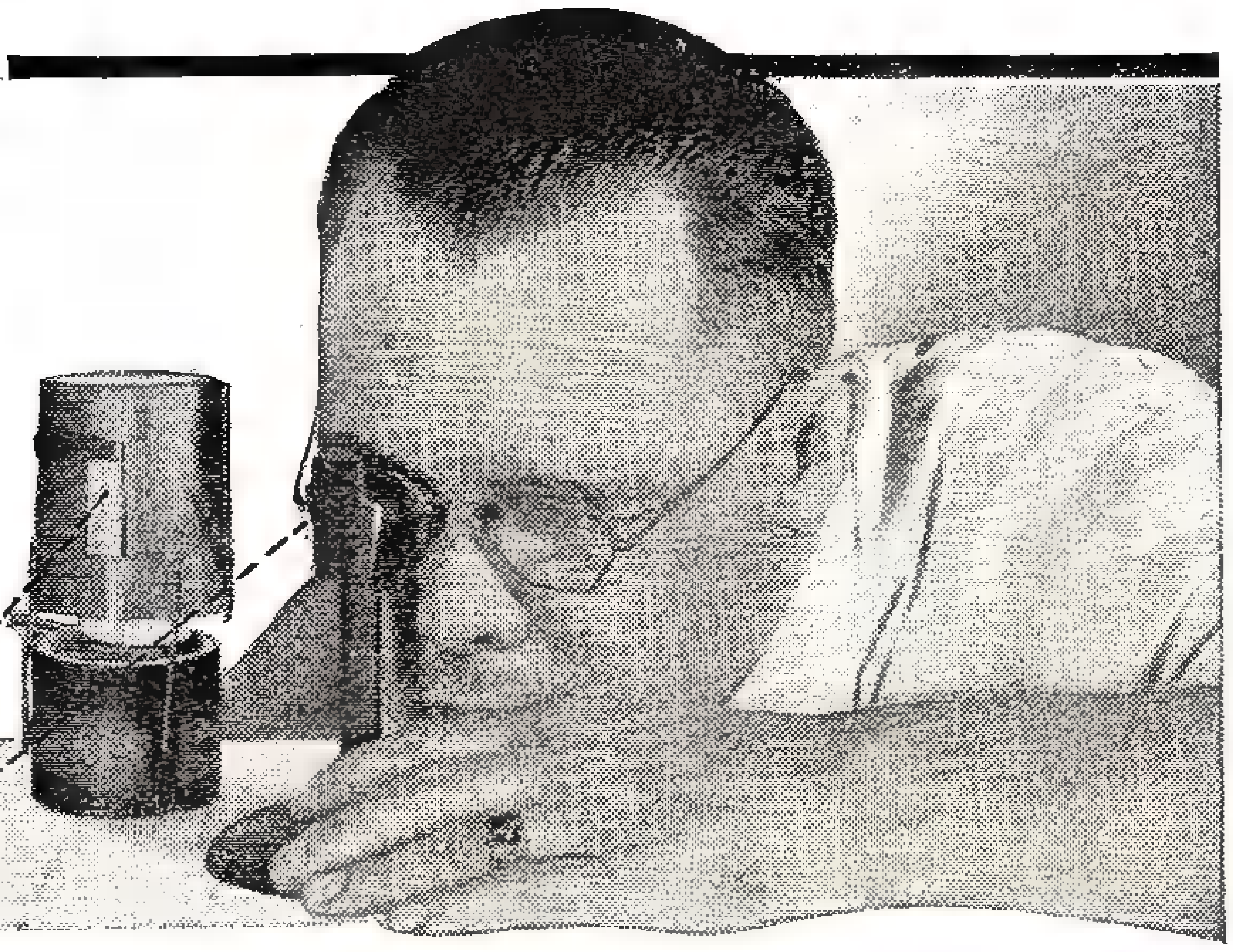
Here's a simple brass frame for the 1" focal length eye-piece which catches the image reflected in mirror.

Either a wood frame or a metal pipe frame (as shown last issue) can be used to hold the mirror and the eye-piece of the simple reflecting type telescope. Above is shown the method of mounting the mirror on a rubber sponge.

"STAR GAZING"—Part II

next finest grade of carborundum, i.e., the No. 120. In mirror grinding, the grinding down to exhaustion of an application of carborundum and water is called a "wet." Proceed with as many "wets" of the No. 120 carborundum as are necessary to obliterate the marks of the coarser No. 80 grade and then test again with the template. Continue with the No. 120 until good coincidence with the template is attained, as the succeedingly finer grades will not appreciably change the curvature.

If your curved mirror surface is a bit too deep it can be made shallower by shortening the stroke; if it has not as great curvature as the template the center of curvature may be shortened by lengthening the stroke. When the proper curvature has been reached, "clean house" most thoroughly again and proceed with the successive stages of fine and finer grindings. Each successive stage of fine grinding should involve about a half-dozen "wets" of 5 or 6 minutes' duration each; until when the No. 6F Turkish emery stage has been passed it should be possible to read fairly fine type through the glass. During the fine grinding stages it is necessary to employ a more accurate means of testing for curvature than is afforded by the relatively rough template. Wash the mirror and the tool thoroughly and dry them.



Here is shown the method of using the simple Foucault apparatus for determining the spherical aberrations of the mirror. All that is needed in the way of materials are a light, a can, a piece of tinfoil and an old razor blade. This will give very accurate results.

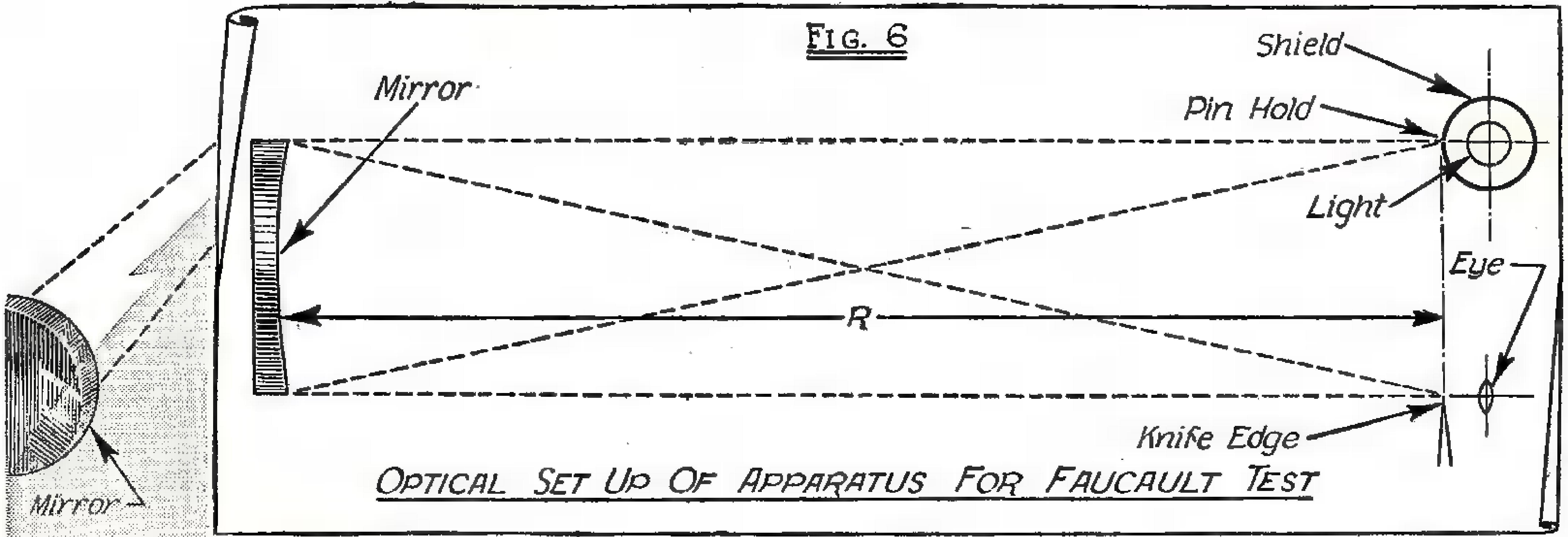
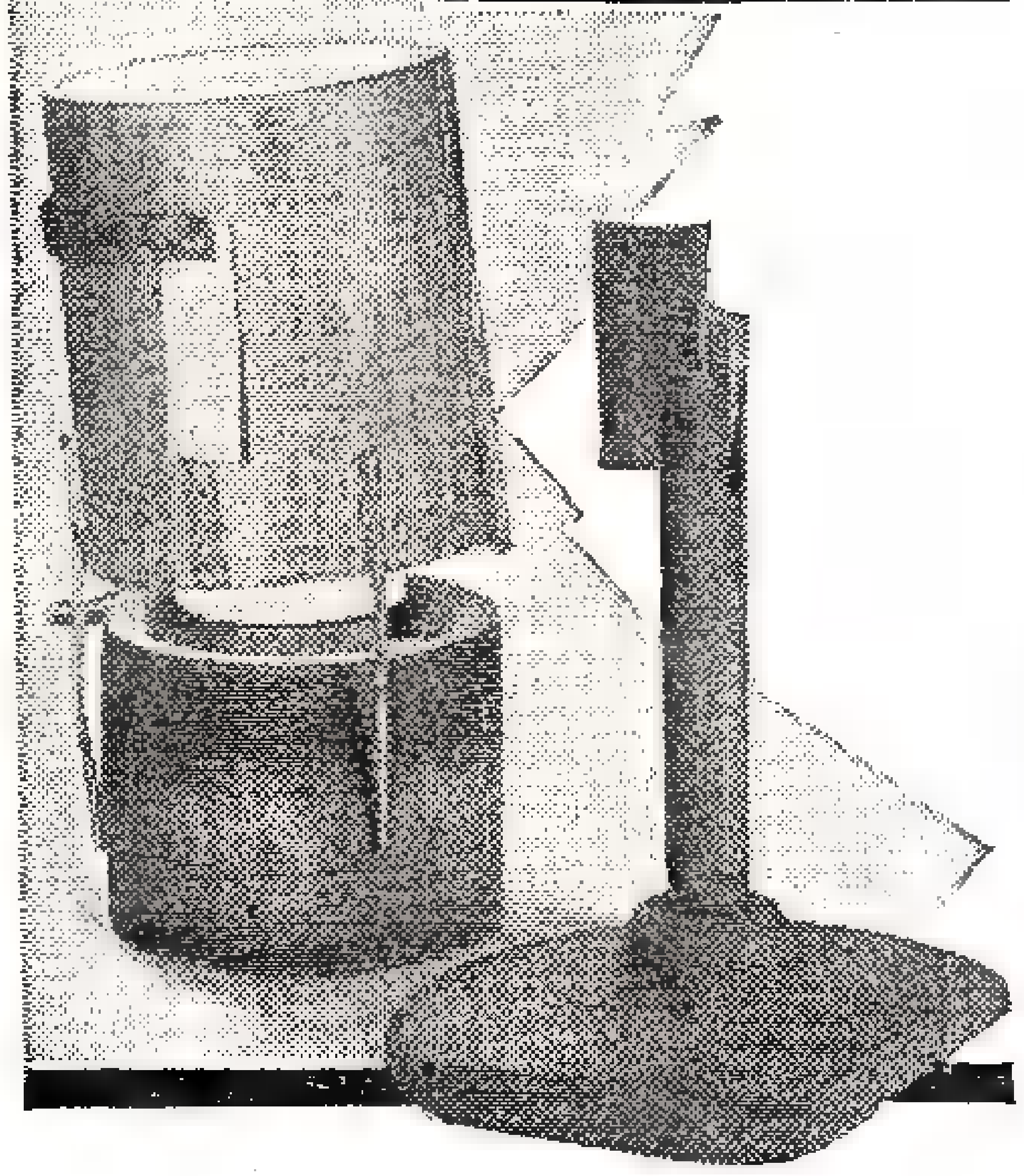


FIG. 6

OPTICAL SET UP OF APPARATUS FOR FAUCAULT TEST

Above is shown the diagram of the Foucault test. If the mirror is truly spherical the pin point of light emanating from the tinfoil will appear to the eye as a bright flat surface throughout the face of the mirror.



Testing for Accuracy

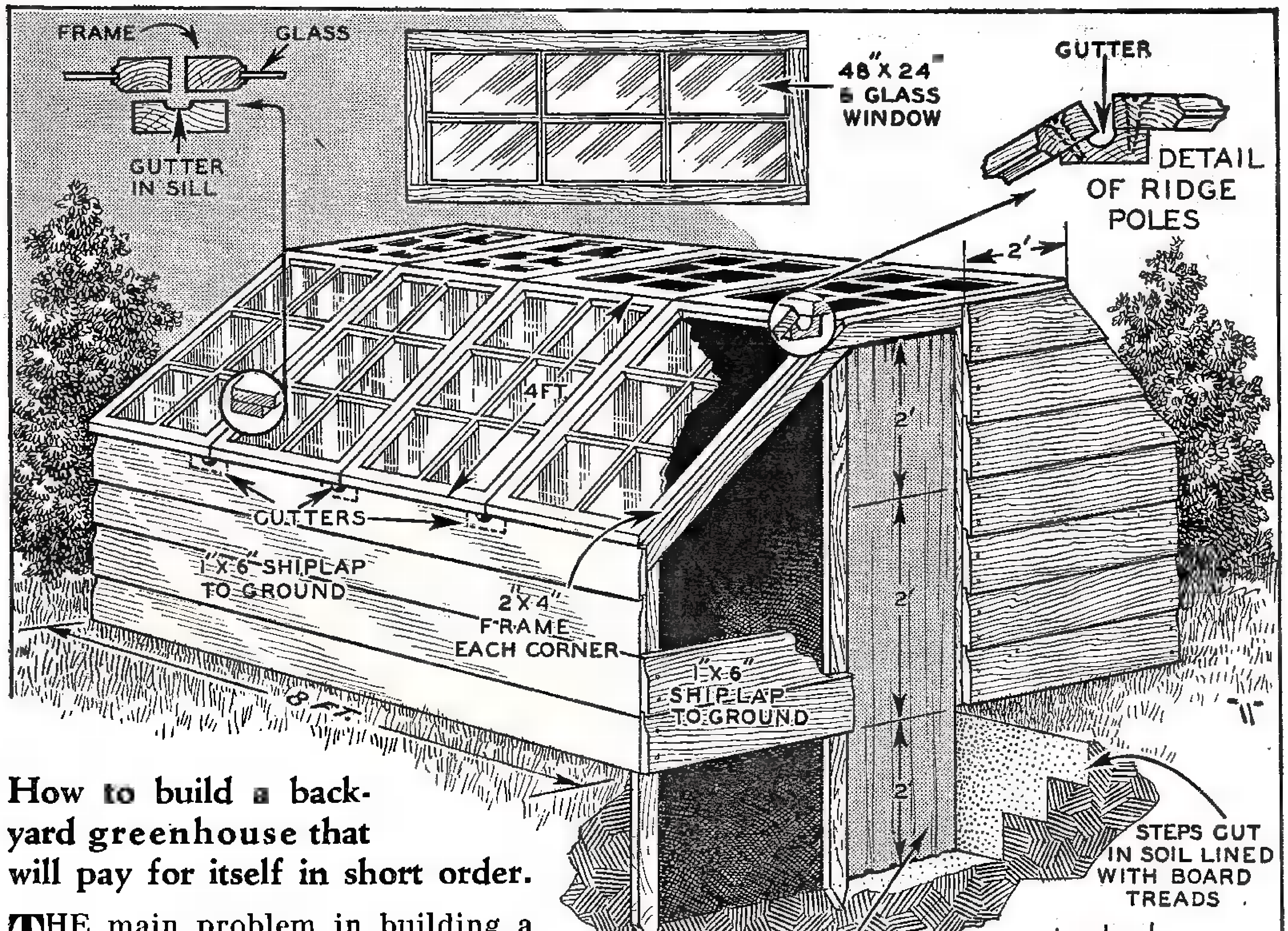
Across the concave surface of the mirror draw two or three pencil-line diameters. Lay the mirror back down on the tool and revolve it around its own axis. If the true spherical relationship has been maintained the pencil lines will rub out equally and simultaneously; if not, the higher or lower areas on the mirror's surface may be equalized by changing the stroke as previously outlined. Upon the successful completion of the grinding stages the mirror is now ready for polishing.

Polishing

"Clean house" thoroughly again as before—more thoroughly if possible. It is a good precautionary measure to remove all subsequent polishing operations to another part of the shop to avoid any possible con-

(Continued on page 24)

A Fifteen Dollar Greenhouse


FRAME
GLASS
GUTTER IN SILL
48" X 24" 6 GLASS WINDOW
GUTTER
DETAIL OF RIDGE POLES
2'
4FT.
2'
2'
2'
GUTTERS
1"X6" SHIPLAP TO GROUND
2"X4" FRAME EACH CORNER
1"X6" SHIPLAP TO GROUND
8 FT.
STEPS CUT IN SOIL LINED WITH BOARD TREADS

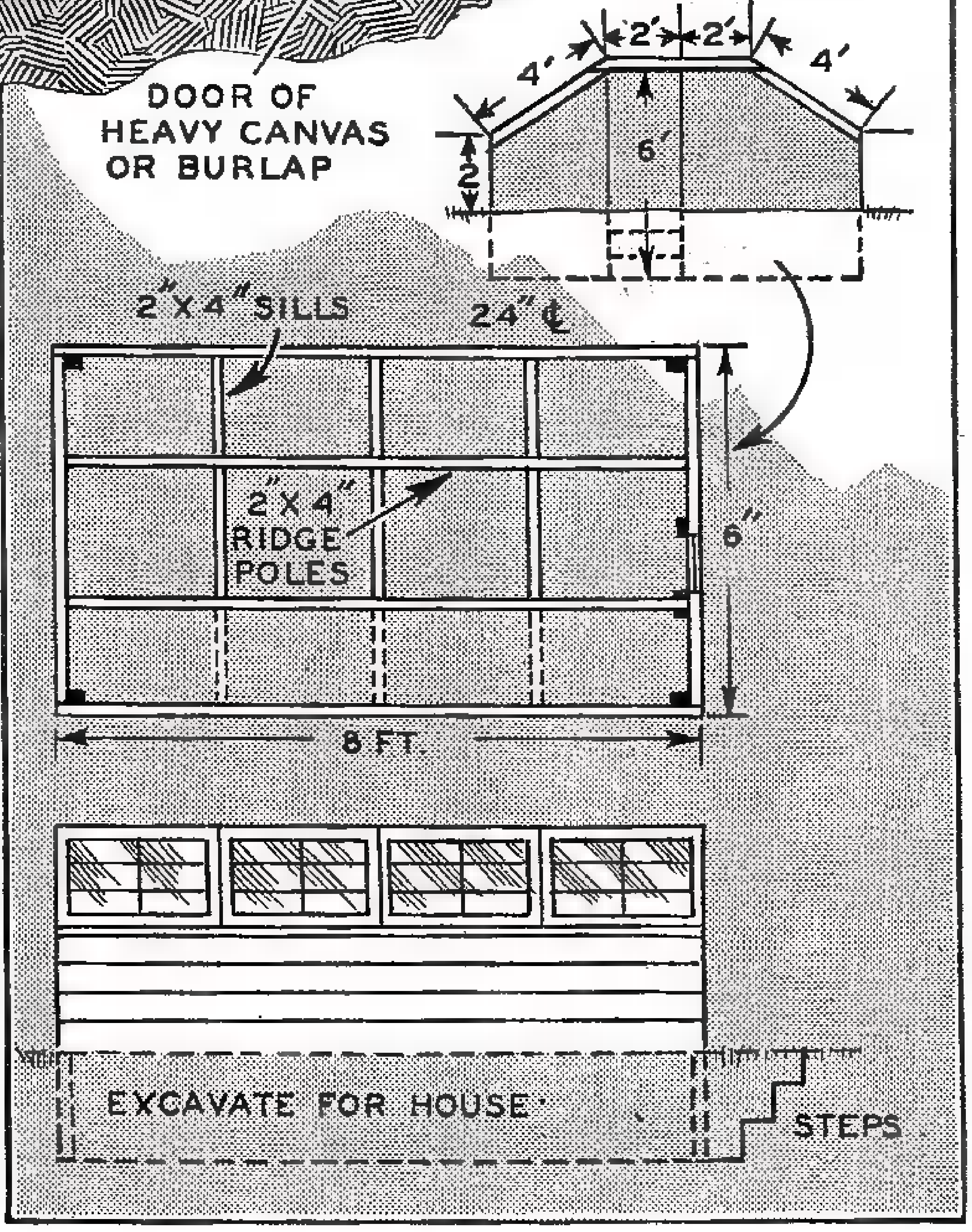
How to build a back-yard greenhouse that will pay for itself in short order.

THE main problem in building a greenhouse is the problem of glass. If we sink our house half into the ground, we do away with a good bit of lumber, and knock draughts and over-night temperature changes in the head. If we use old shiplap and a few 2x4s, we can hurdle that item nicely, for it costs next to nothing. And if we use what is known as "barn sash" to the mail order houses, we find we can get enough glass for $10.08 to make a 6 ft. x 8 ft. greenhouse that will give nearly forty usable feet for sprouting trays. A steady stream of early vegetables and flowers can be sprouted for later transplanting, and we know of one woman who had a little house like this, costing about $15, who made the thing earn its original cost nearly two times over the first season. She went to a few friends and contracted to do their gardening, and dug their tulip bulbs in the fall, got them sprouted early in the spring, and charged a neat little sum for the service.

This house is half sunk, a two feet by six feet by eight feet excavation being needed for head room, increased space. The excavation has the added advantage of keeping the day-round temperature nearly even. A good afternoon's work, and the excavation can be sunk.

Drive four posts each six feet long two feet into the corners of the excavation. On

(Continued on page 126)


DOOR OF HEAVY CANVAS OR BURLAP
4'
2'
2'
4'
6'
2'
2"X4" SILLS
24"℄
2"X4" RIDGE POLES
6'
8 FT.
EXCAVATE FOR HOUSE
STEPS

To save lumber and afford even temperature the house is semi-excavated. The framing plan is ultra simple. Cheap mail-order windows, costing 84c apiece, are laid over simple gutters which carry away rain water. The door is made from several thicknesses of burlap hung on a sliding rod.

PLANNING a SAIL RIG for Your Boat

by SAM WING

SO MUCH correspondence has come in to the editors of good old MM that I have been asked to show you embryo sailors how to fix up that boat as a sailing job.

First, there are only a few types of small boats that make *good* sailboats. These are either old flat bottom rowboats, canoes, ordinary rowboats or the more modern broad sterned outboard boats.

All of these can be converted to sail with little trouble. They will give very fair sailing qualities at minimum expense. Any other type of boat, such as a launch without an engine, or a flat bottom scow, cannot be converted with much success. Some sort of boat shape is needed to give decent qualities when beating to windward. Otherwise the boat will "fall off" and be good for nothing but running before the wind.

Sail Area Needed

From the chart you can see what amount of sail you will most likely need. There is no fast rule that can be used. On lakes where there is little wind, select your sail according to the weight of your boat, and take the next largest area. On ordinary waters choose the sail to correspond with the length of the boat. Where it blows hard, select the weight corresponding to your boat and use the area for the size under, as shown on the chart. I show the average length and average weight of boats of average build so you can have two variables to base your choice of sail area on.

The matter of balance is all important, and is little understood by the amateur, for all the simplicity of the thing.

A good sailboat will exhibit a tendency to "come up into the wind" when the tiller is held normally. This is called "ardency." All boats must have it to sail properly. This ardency is secured by placing the center of effort of the sail, which is theoretically taken as the geometrical center of the triangle it outlines, over the center of lateral resistance of the hull. Actually this works out a little different in practice, as I'll shortly explain.

Lateral Resistance

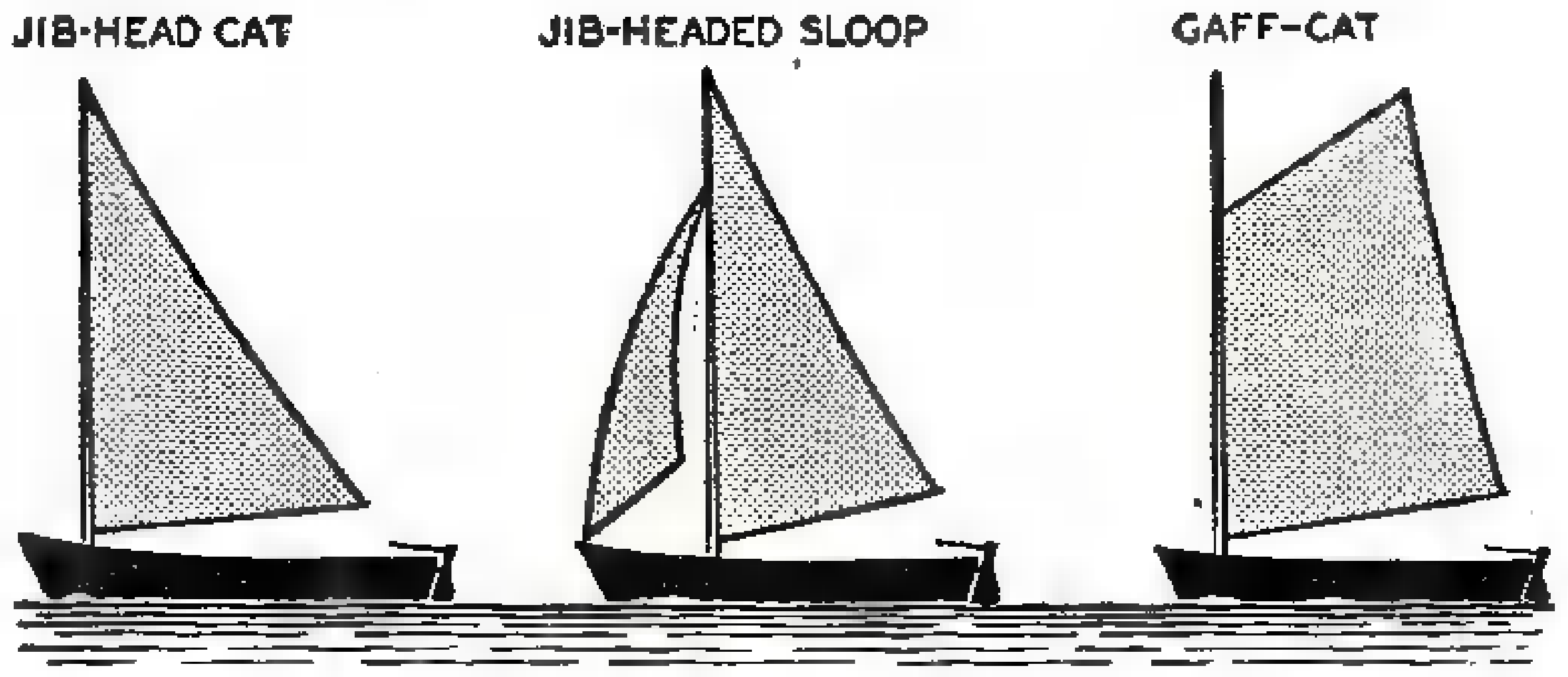
This lateral resistance is the underwater portion of the hull, and is the wedge against which the boat sails when wind pressure develops on the canvas. It usually, in small boats, must be equal to at least one-eighth of the sail area.

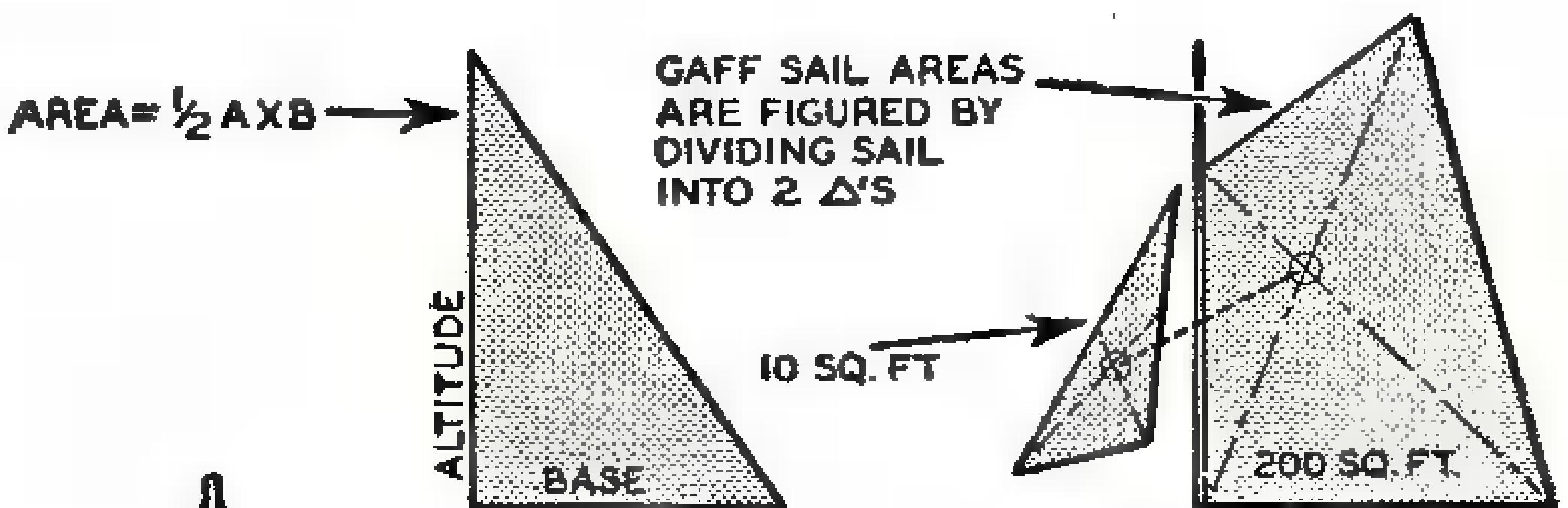
The submerged portion of the drawing shows the lateral resistance of the boat. Where the *hull itself* has not enough underwater portion, as indeed few small boats have, a dagger board, center board, deep fixed keel or other area is added to bring the lateral resistance up to the required area.

Now in actual practice when the sail is "wung out" the center of pressure moves forward. But so does the center of lateral resistance, because of the bow wave thrown up as the boat heels over and travels.

So the proper proportions of center placing for proper ardency are found when the center of lateral resistance is placed slightly behind the center of effort of the sail, as this center travels forward faster than the center of the sail.

(Continued on page 126)





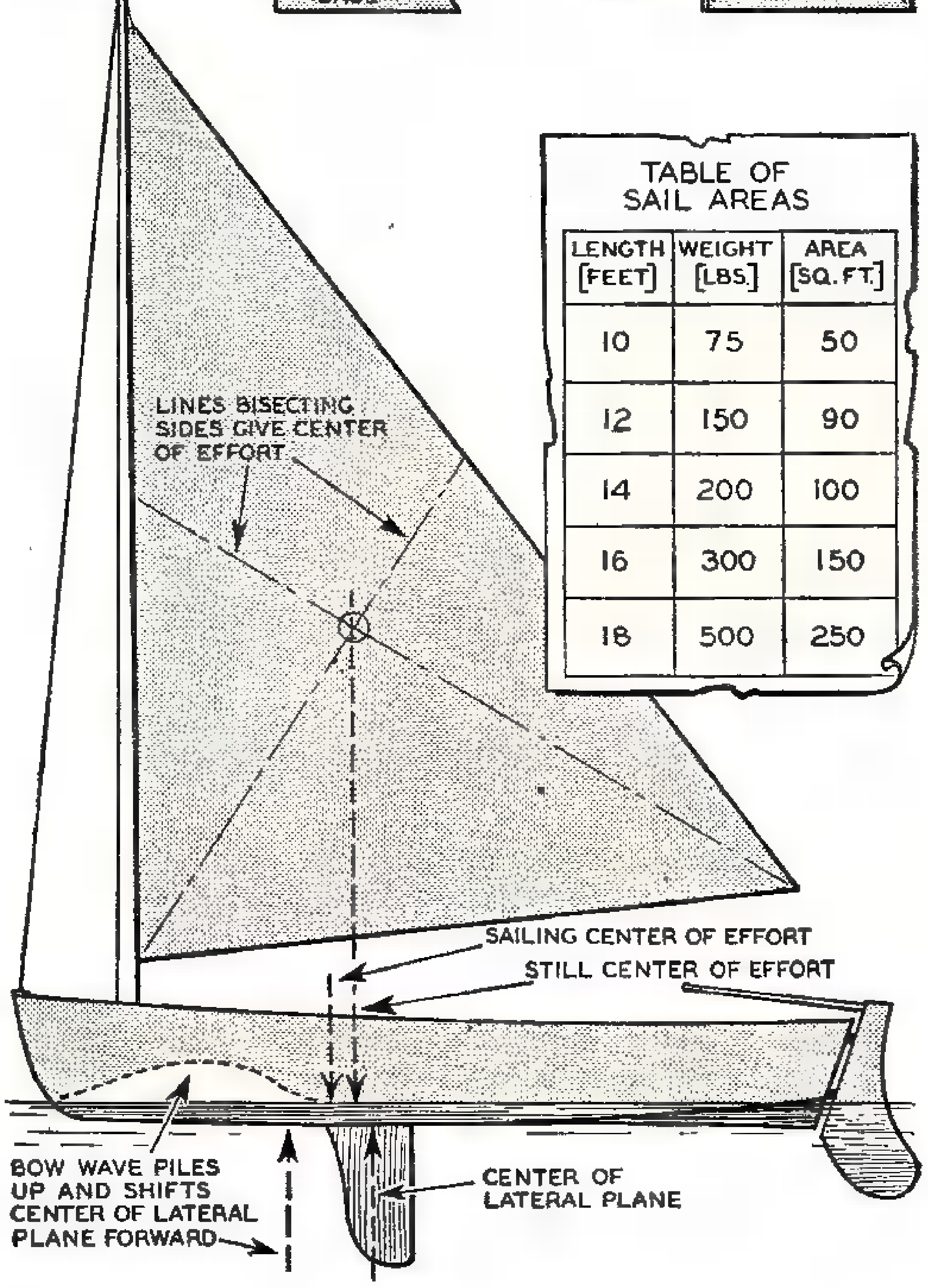

LINES BISECTING SIDES GIVE CENTER OF EFFORT
SAILING CENTER OF EFFORT
STILL CENTER OF EFFORT
BOW WAVE PILES UP AND SHIFTS CENTER OF LATERAL PLANE FORWARD
CENTER OF LATERAL PLANE

TABLE OF SAIL AREAS

LENGTH [FEET]	WEIGHT [LBS.]	AREA [SQ. FT.]
10	75	50
12	150	90
14	200	100
16	300	150
18	500	250

Above are shown a few of the more commonly used sail rigs. The area of a triangle is ½ base times the altitude. Below is explained the reason that the center of effort of the sail must be placed slightly ahead of the center of lateral resistance when still. The lateral center travels forward faster than the center of the sail. Both must balance, or nearly so to give proper sailing ardency, or tendency to come up into the wind with a free tiller.

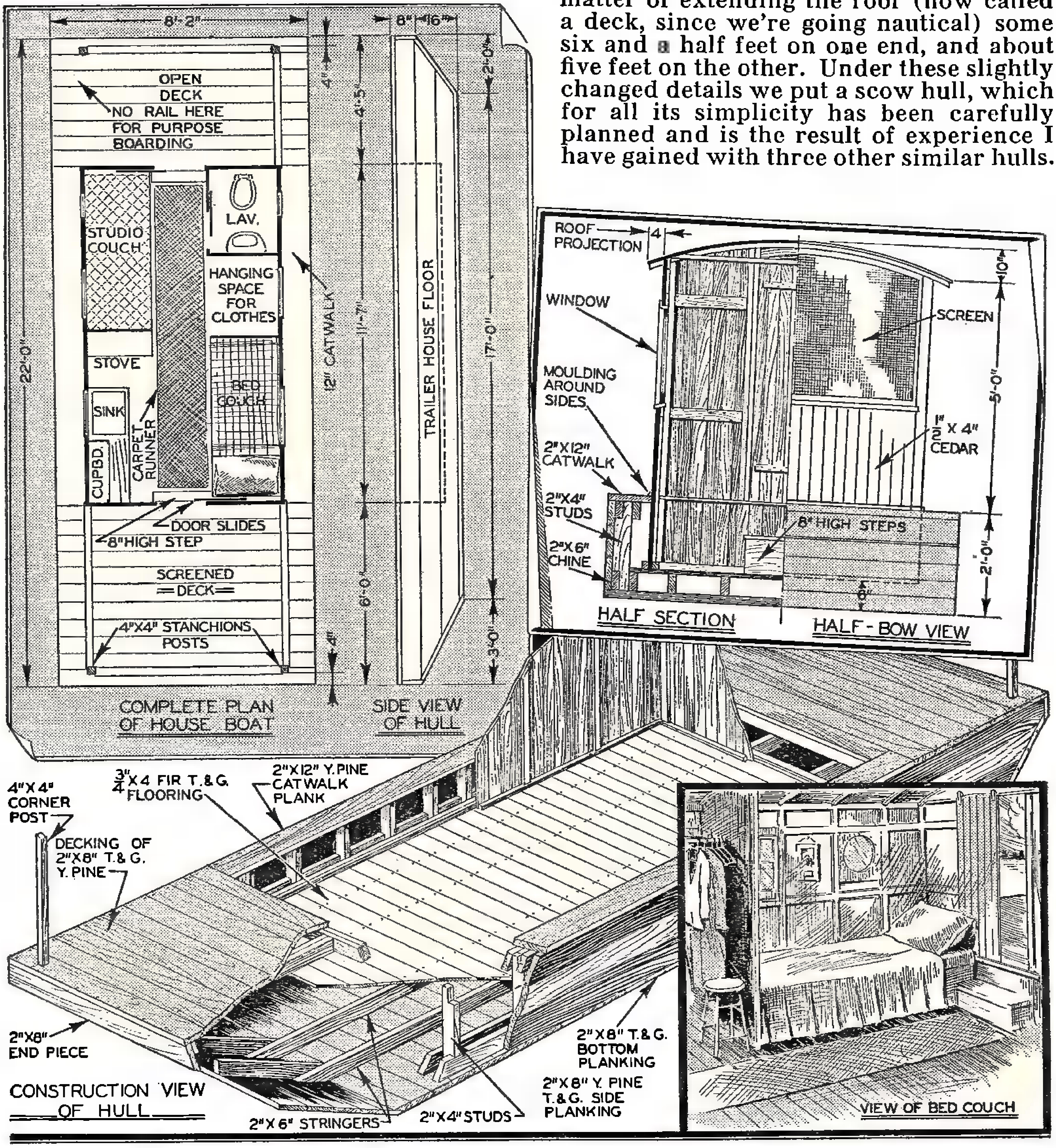
How to Build "Old Man

REMEMBER the time you were out in a boat in the moonlight, and the moonpath shone on the water, and peace and tranquillity were everywhere?

In times like these it is good to realize that the woes of the world are man made; there is nothing wrong with Mother Nature. She makes the bees to buzz, and the corn to grow, the water to surge and the rivers to flow; let's get away from it all and enjoy ourselves in spite of the Depression! Let's take that trailer house we built from plans in M-M a couple of months ago, and put a hull around her so she'll float and then we can while away our time on some southern bayou, or lazily float down the Mississippi or Ohio or Monongahela or Hudson or whatever stream happens to be nearest your home.

Let's go! Here's how:

The house is the same house as was fully and completely dimensioned and detailed in M-M for May. I have not shown this in repetition, for the only changes are the matter of extending the roof (now called a deck, since we're going nautical) some six and a half feet on one end, and about five feet on the other. Under these slightly changed details we put a scow hull, which for all its simplicity has been carefully planned and is the result of experience I have gained with three other similar hulls.


8'-2"
8"
16"
OPEN DECK
NO RAIL HERE FOR PURPOSE BOARDING
STUDIO COUCH
LAV.
HANGING SPACE FOR CLOTHES
STOVE
SINK
CUPBD.
CARPET RUNNER
BED COUCH
DOOR SLIDES
8" HIGH STEP
SCREENED DECK
4"X4" STANCHIONS POSTS
22'-0"
4"
4'-5"
11'-7"
6'-0"
4"
12" CATWALK
TRAILER HOUSE FLOOR
2'-0"
17'-0"
3'-0"
COMPLETE PLAN OF HOUSE BOAT
SIDE VIEW OF HULL
ROOF PROJECTION
4
WINDOW
MOULDING AROUND SIDES
2"X12" CATWALK
2"X4" STUDS
2"X6" CHINE
SCREEN
1/2" X 4" CEDAR
8" HIGH STEPS
10"
5'-0"
2'-0"
6"
HALF SECTION
HALF - BOW VIEW
4"X4" CORNER POST
3/4"X4 FIR T.&G. FLOORING
2"X12" Y. PINE CATWALK PLANK
DECKING OF 2"X8" T.& G. Y. PINE
2"X8" END PIECE
2"X8" T.& G. BOTTOM PLANKING
2"X8" Y. PINE T.& G. SIDE PLANKING
2"X6" STRINGERS
2"X4" STUDS
CONSTRUCTION VIEW OF HULL
VIEW OF BED COUCH

The size of the hull is 22 ft. long by 8 ft. 2 ins. beam, by 24 ins. deep. It will draw about five inches of water. The details of hull construction as explained in the text apply to the middle and half section views. Note the layout is the same as the M-M Cabinette Trailer. The cabin is the same as the one described in the trailer plans which ran in May issue.

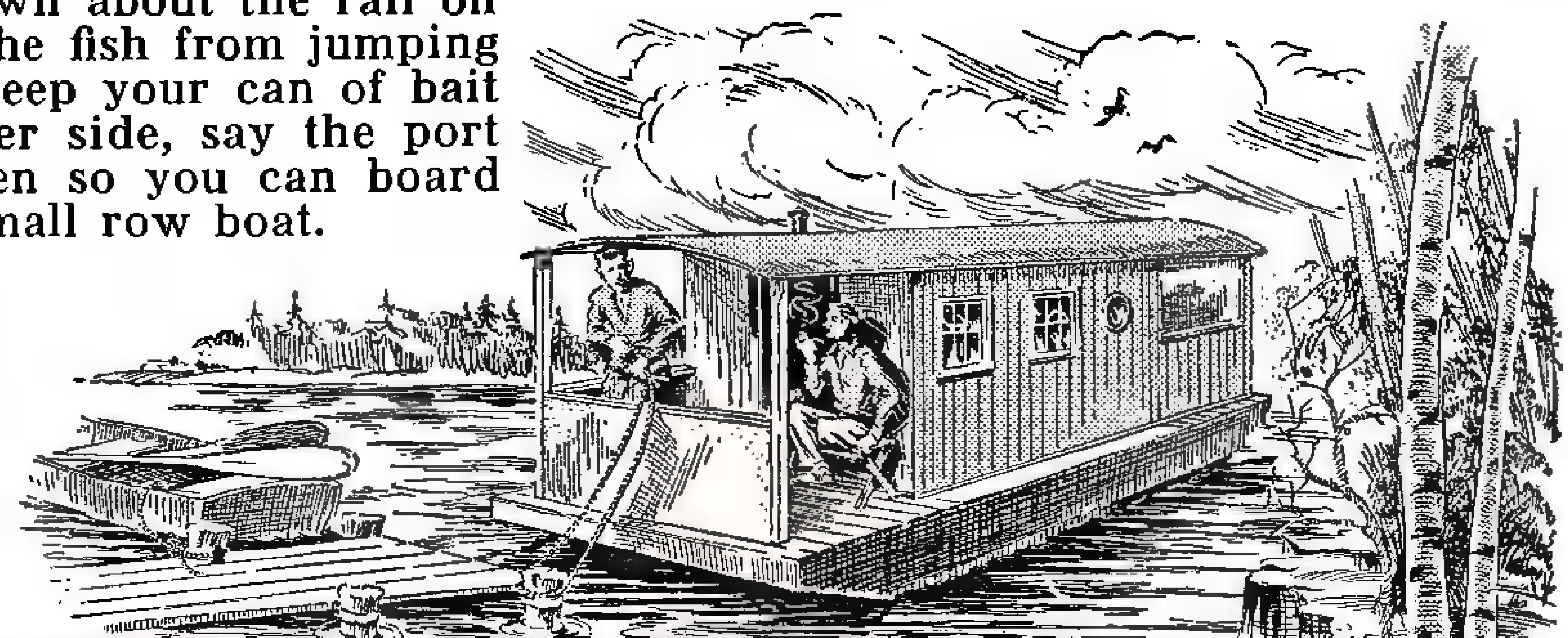
"River" — a Scow Houseboat

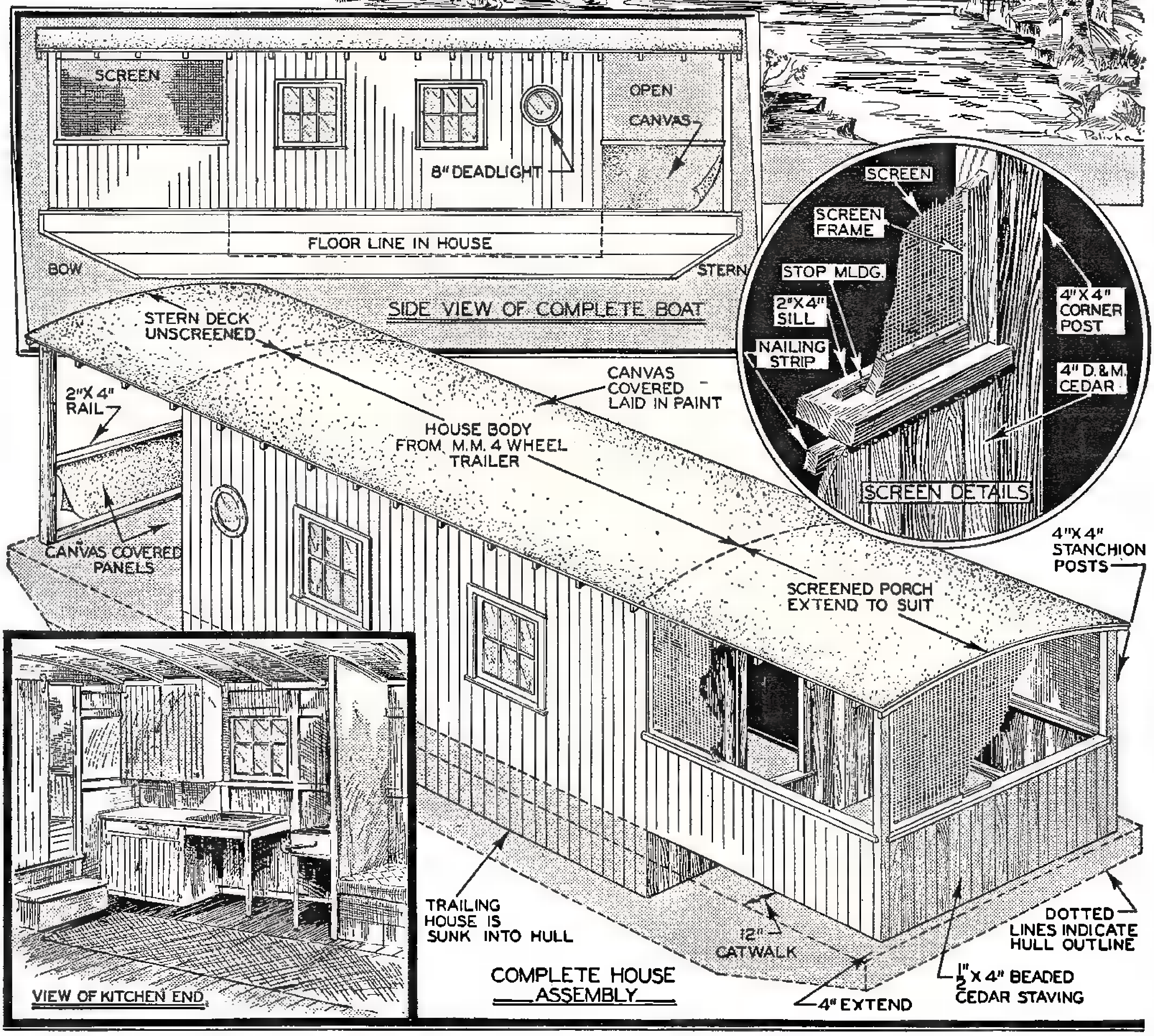
by JARVIS L. STUMPF

Under the ends of the roof—pardon me, I should say deck, we put good old 4"x4" fir pilaster (now called stanchions) and there is our houseboat! One end of the boat can be screened, and the other can have a canvas bulwark thrown about the rail on three sides to keep the fish from jumping on deck when you keep your can of bait outside, and the other side, say the port side, can be left open so you can board your yacht from a small row boat.

The arrangement plan is the same as that worked out for the trailer, and I wouldn't change it a hair. The doors slide to save space, and the kitchen sink, lavatory, stove and toilet have all been placed with an eye to trimming the ship properly. If you go shifting the weights around you will have a boat that will sit

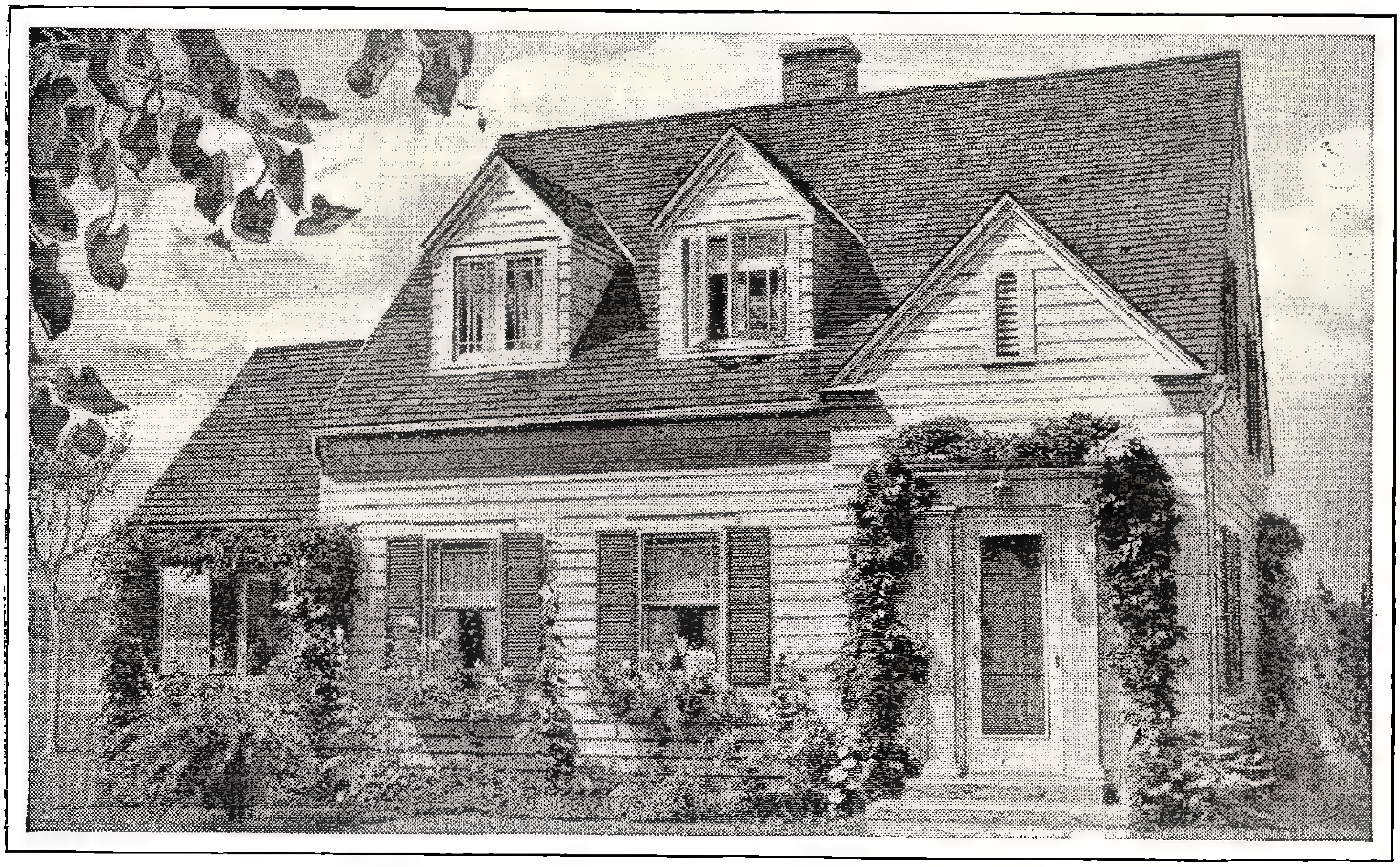
(Continued on page 128)




SCREEN
OPEN
CANVAS
8" DEADLIGHT
FLOOR LINE IN HOUSE
BOW
STERN
SIDE VIEW OF COMPLETE BOAT
SCREEN
SCREEN FRAME
STOP MLDG.
2"X4" SILL
NAILING STRIP
4"X4" CORNER POST
4" D.&M. CEDAR
SCREEN DETAILS
STERN DECK UNSCREENED
2"X4" RAIL
CANVAS COVERED LAID IN PAINT
HOUSE BODY FROM M.M. 4 WHEEL TRAILER
CANVAS COVERED PANELS
4"X4" STANCHION POSTS
SCREENED PORCH EXTEND TO SUIT
TRAILING HOUSE IS SUNK INTO HULL
12" CATWALK
DOTTED LINES INDICATE HULL OUTLINE
$\frac{1}{2}$"X 4" BEADED CEDAR STAVING
COMPLETE HOUSE ASSEMBLY
4" EXTEND
VIEW OF KITCHEN END

The thumb nail sketches show how attractive the interior can be made. The catwalk space of 12 ins. around the cabin is necessary for handling the boat. Elevation and isometric details show the plan of the outboard profile and how the roof of the trailer cabin is extended in the ends to make service and screened porches.

Better Investment than Gold Bonds



House No. 5-W-25 is built in Colonial style—a style always popular. There are six rooms, bath and porch, which may be either open or closed. Cost of this beautiful home, designers assure, is very reasonable.

by MAURICE I. FLAGG

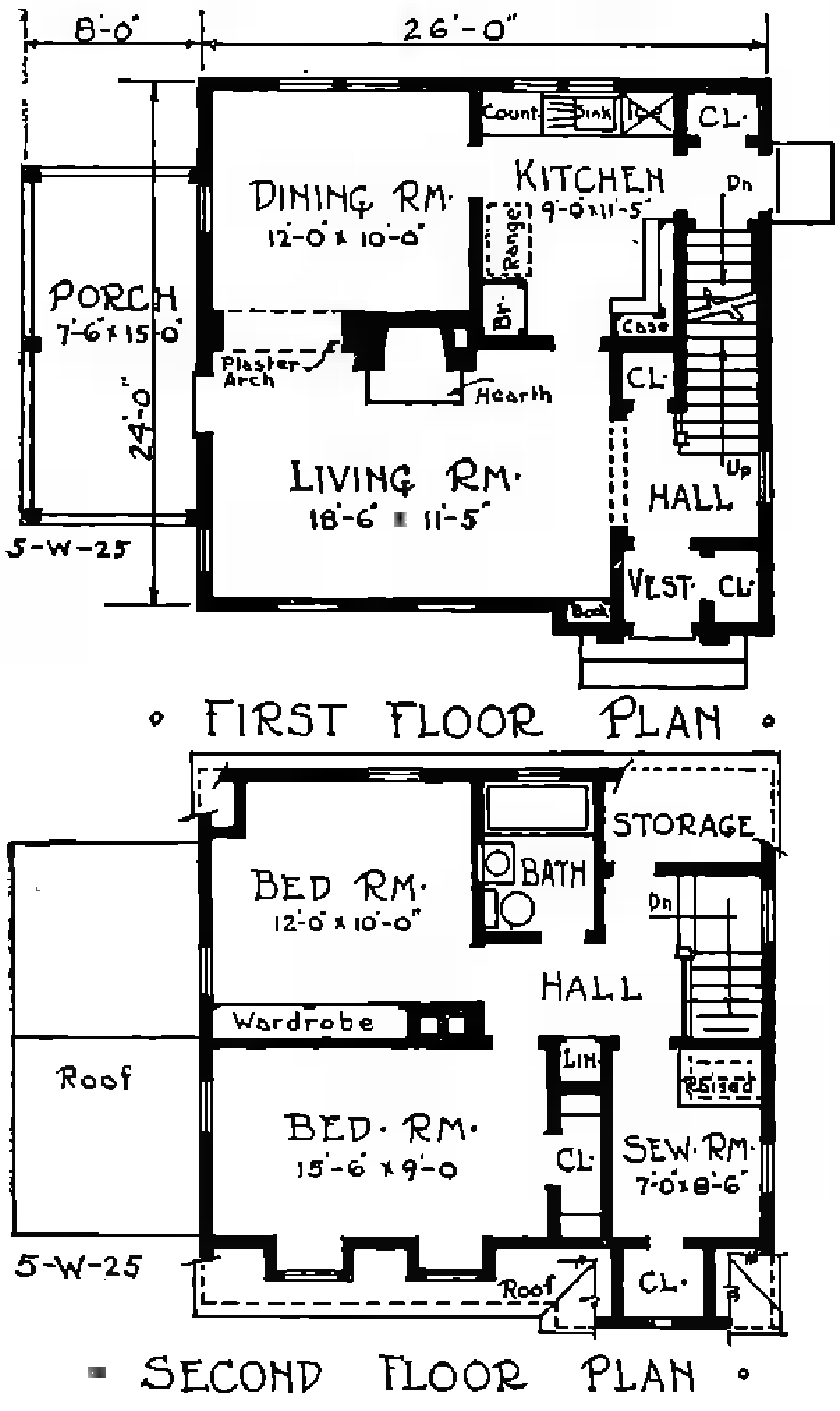
BELIEVE it or not, if you own a good house and lot and have built or bought them at a right price they can't shrink over night, pass out of sight and become a flat tire like many a gold security has these past three years.

Regardless of some fluctuation in the value of property, your house and lot remain the same size, they can be lived in, they are tangible, you can see them and unless an earthquake or fire wipes you out entirely the money represented in your property is safer, more secure than in many a so-called gold bond.

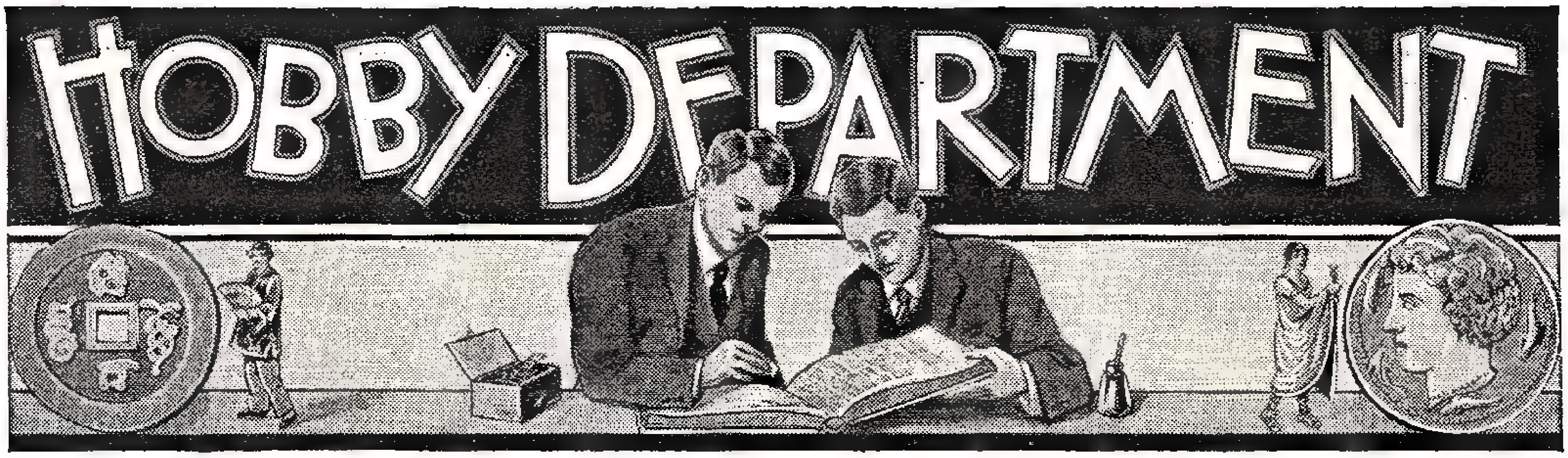
Authorities and others predict that as we emerge from the depression, real estate and property ownership will prove the safest and wisest of all investments. And that's something these days of rising prices, lower incomes and uncertainty ahead.

You have in the house above (No. 5-W-25) a summation of years of study and experience by practical builders in evolving what may be called a model home in room arrangement, good construction and dollar value. There are six rooms, bath and porch which may be either open or closed. If the porch is built to the rear of the dining room the house may be placed on a 40-foot lot. By slight readjustment of the second floor plan the sewing room can be made a bedroom.

The house is all wood, siding painted white, green blinds and green shingle roof. The style is Colonial which means that 25 years hence the style will be just as good as it was when Washington built Mt. Vernon. The cost to build is reasonable and depends upon equipment used and where you build.


8'-0"
26'-0"
24'-0"
PORCH 7'-6" x 15'-0"
DINING RM. 12'-0" x 10'-0"
KITCHEN 9'-0" x 11'-5"
Count.
Sink
Ice
CL.
Dn
Range
Br.
Case
Plaster Arch
Hearth
CL.
LIVING RM. 18'-6" x 11'-5"
Up
HALL
VEST.
CL.
Book
5-W-25
FIRST FLOOR PLAN
STORAGE
BED RM. 12'-0" x 10'-0"
BATH
Dn
HALL
Wardrobe
Lin.
Raised
Roof
BED. RM. 15'-6" x 9'-0
CL.
SEW. RM. 7'-0" x 8'-6"
5-W-25
Roof
CL.
SECOND FLOOR PLAN

Floor plans for house No. 5-W-25, shown above. For complete blueprints for houses illustrated here send $1.00 to Modern Mechanix Home Building Editors, 529 South 7th Street, Minneapolis, Minn. Two new plan books, "32 Low Cost Homes for Newlyweds" and "16 Selected Homes for Lean Purses" illustrating time, space and labor-saving bungalows, may be had for 15 cents each, or both for 25 cents, from Modern Mechanix home building editors.

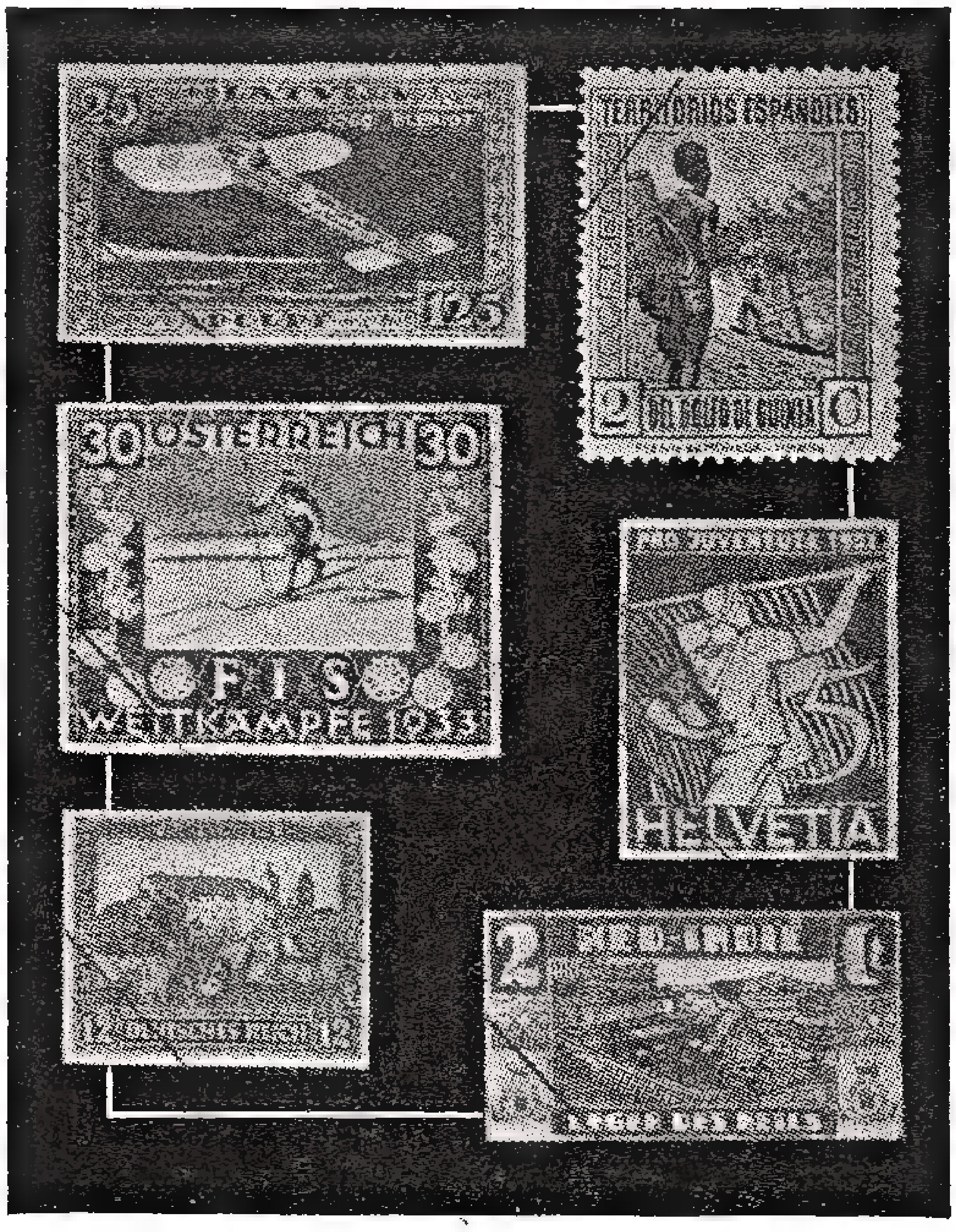


Handy List for Identifying Nationality of Various Stamps

FEW beginning collectors have not been puzzled at one time or another as to how to determine the country or origin of certain stamps, without a catalogue. Frequently the foreign terms used on stamps are so unfamiliar that the collector can do no more than hazard a guess as to their meaning. To make the identification problem simple, the list below presents the foreign words appearing on stamps and identifies them by country. In some instances the term refers to the denomination of the stamp in foreign currencies, in other cases it is the native name for the country of origin.

Ablosung	Prussia
Acores	Azores
Algerie	Algeria
Allemand	Germany
Afghan	Afghanistan
Andorre	Andorra
Anna	India, Mesopotamia, Zanzibar
Aur	Iceland
Avos	Macao
Aytomonoe	Epirus
Aenton	Greece
Bani	Roumania
Bayern	Bavaria
Belgie Belgique	Belgium
Bosnien	Bosnia
British South Africa	Rhodesia
Cabo	Cape
Cameroun	Camaroons
CCCP	Russia
Cent	Luxemburg, Netherlands, Italy
Centime	Luxemburg
Ceskoslovenska	Czechoslovakia
Correio	Portugal, Timor
Correos	Cuba, Mexico, Nicaragua, Spain
Cote D'Ivoire	Ivory Coast
CPbnJA	Serbia
Ctotnhkn	Bulgaria
Danmark	Denmark
Dansk	Danish
Doplata	Cent. Lithuania
Deutsch	German
Deutsches	Germany
Durch	Prussia
Eesti	Esthonia
Emirdities	Albania
Eire	Ireland
Espana	Spain
Ethiopie	Abyssinia
Ellae	Greece
Filler	Hungary
Flugpost	Germany
Francaise	France
Freimarke	Prussia
Groschen	Austria
Guerches	Abyssinia
Guayane	Guiana
Guinee	Guinea
Haka	Montenegro
Haleru	Czechoslovakia
Hapo	Ukrainia
Helvetia	Switzerland
Hoby	Montenegro
H T	Upper Silesia
Haute	Upper

(Continued on page 124)



Can you identify the nationality of the above stamps from the terms printed on them? The list published herewith makes the task an easy one. To make it even simpler, we'll identify these for you, from left to right: Latvia (Latvija); Spanish Guinea (Territorios Espanoles de Golfo de Guinea); Austria (Osterreich); Switzerland (Helvetia); Germany (Deutsches Reich); and Dutch East Indies (Ned-Indie).

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STAMPS, 300 Different 15c, 50 Different African 15c. Lists free. Michael, 942 23rd, Bellwood, Ill.

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50 FINELY Assorted Japan 10c. Hollystamco, Box 1966, Hollywood, California.

Identifying Nationality of Stamps

(Continued from page 123)

Inkeri	N. Ingermanland
Italiane	Italy
Island	Iceland
Johore	Stts Settlements
Kap	Latvia
Karolinen	Caroline
Kedah	Stts Settlements
Kelantan	Stts Settlements
Kon	Batum, Far East. Republic, Finland, Latvia, Russia, South Russia, White Russia.
Kphth	Crete
K U K	Austria, Bosnia, Jugoslavia
K Wurt	Wurtemberg
Lattaquie	Latakia
Liban	Lebanon
Libanaise	Lebanon
Lietuva	Lithuania
Litwa	Cent. Lithuania
Magyar	Hungary
Mapka	Russia
Markkaa	Finland
Maroc	French Morocco
Moyen	Middle Congo
Mocambique	Mozambique
Napa	Serbia, Montenegro
Ned	Dutch
Nederland	Netherlands, (Holland)
Norge	Norway
Nouvelle	New
N Semblin	Stts Settlements
Ore, ora	Denmark, Norway, Sweden
Ottomanes	Turkey
Osterreich	Austria
Oubangi	Ubangi
Paras	Turkey
PCCP	Russia
Pahang	Stts Settlements
Pen	Finland
Penning	Germany
Perak	Stts Settlements
Persane, s	Persia
Peseta	Spain
Pfennig	Bavaria, Wurtemberg
Piastre	Palestine
Plebiscit	Schleswig
Poczta	Poland
Porto	Austria
Polska	Poland
Pyb	Russia
Quintar	Albania
Recember	Macao
Reich	Germany
Ruandi Urandi	Belgian E. Africa
Rublis	Latvia
Saargebiet	Saar
Selangor	Stts Settlements
Sen	Japan
Shqiptare	Albania
S H S	Jugoslavia
Skill	Norway
Slesvig	Schleswig
Sol	Peru
Soumi	Finland
Stothnkn	Bulgaria
Suid Afrika	South Africa
S Ujong	Stts Settlements
Sverige	Sweden
Tanga	Portuguese India
Tchad	Chad
Tebetalen	Netherlands
Toga	Tonga
Touva	Tannou Touva
Trengganu	Stts Settlements
Uaka	Montenegro
Ultramar	Cuba
Vaticane	Vatican City
Yn	Japan
Z Afr.	Republik Transvaal
Zuid	South

There are some stamps which can be identified as follows:

Llama	Symbol of Peru
Lion and Sun	Persia
Hammer and Sickle	Russia
Crescent and Star	Turkey or Syria
German stamps marked Nr. 21	Prussia

Suppose you have a stamp on which is written what looks like "napa". A glance at the list shows this to be either Serbia or Montenegro. Further study finds the word CPBnJA (with a hook on the B and N backwards). You will find that the stamp is then from Serbia and it may be placed under that country in your album.

Stts Settlements is abbreviated from Straits Settlements.

While not complete, this list should help any collector to locate nearly all of his stamps and as he becomes more advanced he should have little difficulty in identifying any stamp that he may come across.

Plans for a Dirt Track Racer

(Continued from page 29)

forward end of the driver's seat cushion. A tongue and groove slip-joint is used. This is secured with bolts.

The instrument board is bolted into the angle iron body frame and is made from a ⅞" thick piece of plywood. The face of the instrument board is aluminum as is also the fire wall. It should be remembered that a fire wall between the engine and driver's compartment of aluminum not less than 3/16", is a requirement. This may be steel of a lighter gauge but must be metal. Floor boards must be of metal construction.

Upholstering is the conventional type used in automobiles and is designed to fit over the deck and seat portion of the body to which it is clipped by means of Dot or Snap-on fasteners. The seat cushion is relatively thin (about 2") so as to bring the driver well down into the body.

Those desiring to build all-steel bodies will find that the most difficult part is forming the metal over the curves, such as are shown in the cowl and deck section.

First build up the body frame and then use paper and lay it on the body frame to get an idea of how to cut the metal. Use auto body steel, 20 gauge. There are several ways to work body metal. It may be stretched by hammering or it may be shrunk by heating and hammering.

The easiest part to make is the hood. This has but one uniform curve and a paper pattern will quickly show you how. The next thing is the cowl. Here the scoop effect may be secured by first bending the metal sheet to fit over the frame sections A and B without thought to the scoop. Next heat the scoop portion with a gas flame and hammer out and up with a wood mallet, with a rounded end. Work at it until the scoop is roughed out and then, with a dolly block and planishing hammer, smooth up the job. Another way to do this is to split the metal in the scoop and bend out the sections. Fit in other metal sections and weld in place.

The rear section or deck is hardest. Experiment with paper patterns until you get it figured out to your liking. Then use the hammer and heat to stretch or to shrink, as needed. Perhaps the best plan is to make the deck from pieces, split along the back, down the tail and underneath. After they are shaped to form, trim the edges and weld together to make one piece.

The edges of the cowl near the wheel should be turned in around a 3/16" steel rod to form a rounded or wired edge. Likewise with the forward edge of the deck. When body steel hardens under the continued hammering, it may be softened or annealed by heating to a cherry red. Watch that you do not burn it.

Build up for a paint job just as any lacquered paint job is built up. Light colors are usually more striking. The C-8 is white, trimmed with maroon.

BLUEPRINTS made from the original drawings illustrating this article, but done up in large size for shop use, are available for $4 from Modern Mechanix and Inventions, 529 S. Seventh Street, Minneapolis, Minn.

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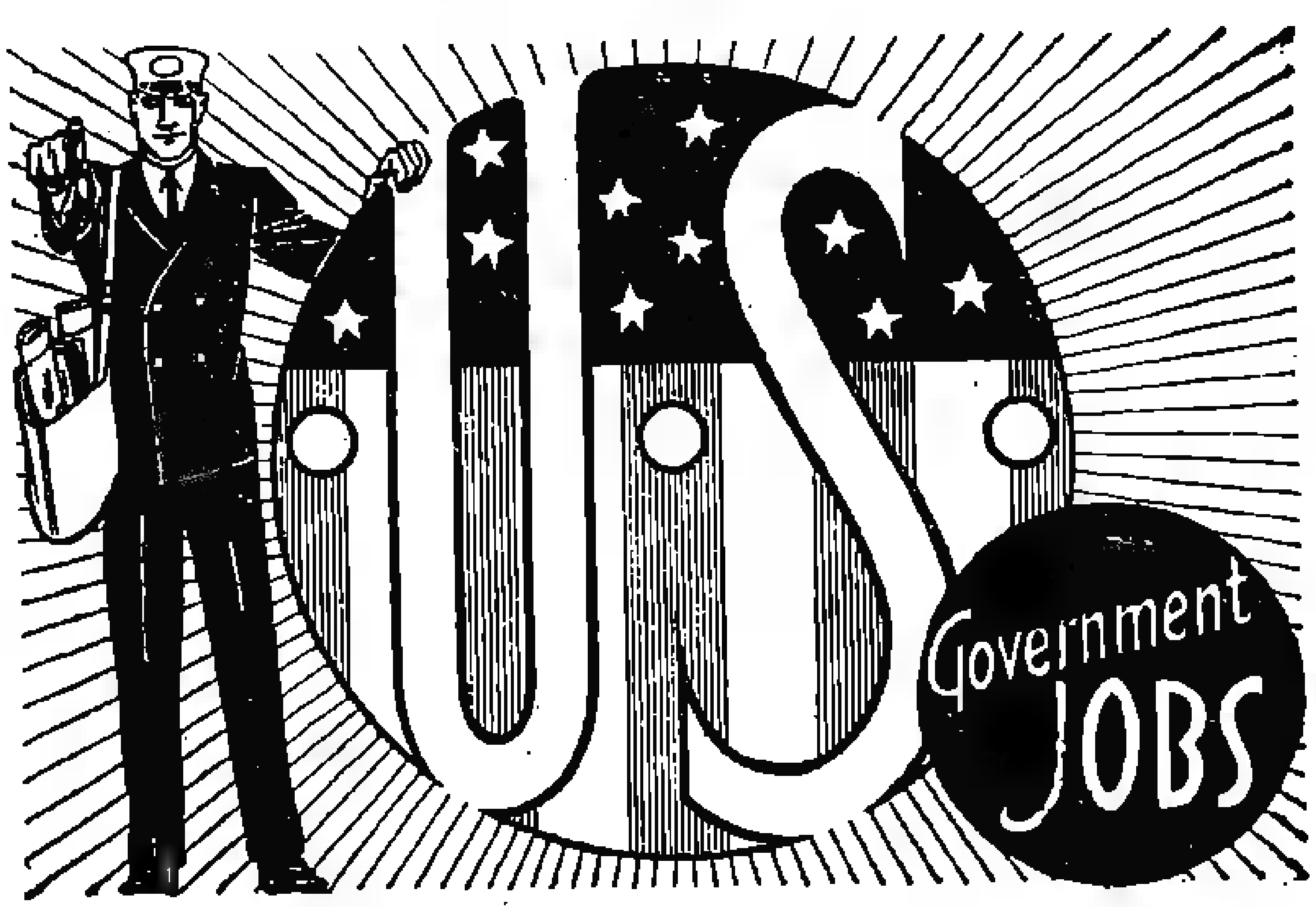

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Build a Fifteen Dollar Greenhouse

(Continued from page 118)

the six-foot side drive two more, eight feet long, so that when you have finished driving them they are forming the door sides on one side of the house, and serve to support the ridge poles at the other.

Only two complete sets of rafters are needed. These are, of course, at the ends. They are four feet on a side to take the particular 48" by 24" six paned windows which the mail order houses like Montgomery Ward are quoting at 84 cents apiece this spring.

Place the ridge poles in and drive a couple of 20d spikes in each end. Cut a gutter for the water to drain off in. Never mind putting a pitch in the gutters. The water will blow off from the wind in a house this small, and if a drop or two gets into the house, what of it—it's a greenhouse, isn't it? In actual practice in big greenhouses the matter of watertightness is not carried beyond the point of shedding water.

Then the sills are put in. These too have gutters cut in them, and they are made to drain outdoors as the drawing shows.

Order your windows, and then board up the sides for a height of two feet, and ceil the ends in with the same lumber. At one end a door is cut, and is closed against the winds in Indian fashion, with a thick piece of canvas, or old blanket, or burlap sewed together from potato bags. If you insist, being a city dweller, a small frame can be made and screen-glass be put on it. This will make the little house look very civilized.

One of the flat windows on the top should be pegged down instead of screwed, as are the others. On hot days you may want to raise it for ventilation.

Boiled oil and creosote will give a very finished appearance to the house, and then all you have to do is move in your watering pot, your trays, and let the sun shine. The temperature will almost take care of itself, and will vary but little. It will be colder inside the greenhouse daytimes and warmer nighttimes, particularly in spring. Special requirements can be met by watching a thermometer and varying the ventilation.

Planning a Sail Rig for Your Boat

(Continued from page 119)

The most used small boat rigs are shown in the thumb nail sketches. The cat rig is the rig (no matter what the name of the sail that is hung on it) that has the mast stepped right up in the bow of the boat. In small boats this allows room for occupants, and places the center of effort at the right place. Thus we have the jib headed cat rig—(the cat rig with a jib headed sail hung on it) and we have the gaff headed cat rig (cat rig with a gaff headed sail).

Both of these are largely used on small boats. Lately the gaff rig has fallen off in favor because the gaff is awkward, requires a lot of extra rigging, and slats badly when there is no wind to fill it.

On slightly larger boats it may be difficult to get the proper center of effort placed right over the center of lateral resistance in one sail alone, so two sails are used. The areas of the sails are

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29x4.75-20	2.25	0.95
29x5.00-19	2.60	1.05
30x5.00-20	2.60	1.05
28x5.25-18	2.65	1.15
29x5.25-19	2.75	1.15
30x5.25-20	2.75	1.15
31x5.25-21	2.95	1.15
28x5.50-18	2.95	1.15
29x5.50-19	2.95	1.15
30x6.00-18	2.95	1.15
31x6.00-19	2.95	1.15
32x6.00-20	3.00	1.25
33x6.00-21	3.20	1.25
32x6.50-20	3.20	1.35

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32x4	2.75	0.85
33x4	2.75	0.85
34x4	2.75	0.85
32x4½	2.95	1.15
33x4½	2.95	1.15
34x4½	2.95	1.15
30x5	3.25	1.35
33x5	3.25	1.45
35x5	3.50	1.55

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Planning a Sail Rig for Your Boat

divided up into triangles, centered, and as for instance in the drawing where 200 feet of sail is offset somewhat by 10 feet of jib, and the jib is 10 feet from the center of effort of the big sail, the final center is figured by the method of moments, familiar to anyone who ever worked out a lever problem in school. We take the moment of the small sail as being 10 (its area) by 10 (its distance from the c.e. of the big sail) and we get 100. We multiply the area of the big sail by unity, and get 200, its own moment. Now the total moment is 300, and we divide this by the moment of the small sail, we get ⅓. Therefore the center of effort of the whole sail system is ⅓ the distance between the big sail and the small one, which makes it about 3.33 ft. down toward the jib from the center of the big sail. This gives the final center to use in placing the sail plan over the previously measured center of lateral resistance.

And a way to measure the center of resistance with or without a board is to pull the hull sidewise by a rope. Where it balances and pulls straight sideways is the place where the center of lateral resistance is located. That is the point above which you must place your sail effort.

Creating Mural Masterpieces

(Continued from page 84)

A canvas, rolled on drums like an ordinary window curtain but inverted, was suspended from the four-storied ceiling along one wall of the studio. It was then lowered to full length.

On the other side of the studio a platform was erected about twenty feet high. Here Cornwell mounted a powerful projection machine and lens and by means of his photographic miniatures threw the greatly magnified image on his canvas screen.

In applying color, the artist again resorted to practical mechanics. A working platform was constructed in front of the canvas in fixed position. The sheet was then re-rolled on its drum and suspended from the ceiling this time exactly like a window curtain. Beginning at the bottom and working upward, the artist had the canvas pulled down to comfortable position before his working platform.

First of the completed panels was turned out last summer and hung in the library.

In placing the murals heavy scaffolding was first erected to a height of seventy feet. Elaborate block and tackle systems were then called into play. Rolled up on their wooden drums and cradled at each end in steel axle housings, the paintings were once more reversed and unrolled slowly, the top having been anchored to firm wall piers capable of supporting their great weight.

As the paintings were bit by bit unrolled, a dozen painters industriously applied white lead to the wall area. The canvas was quickly flattened against this film, it being essential to a perfect bond that the lead did not dry before the application. Proceeding a few inches at a time, the process of hanging each mural was a matter of many hours. Despite delicacy of the operation, however, all twelve were installed without a single mishap.

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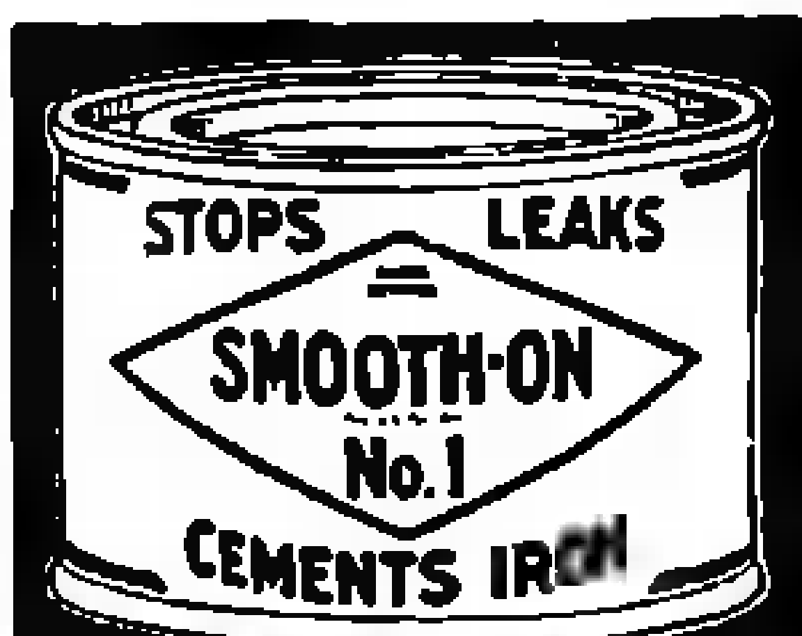

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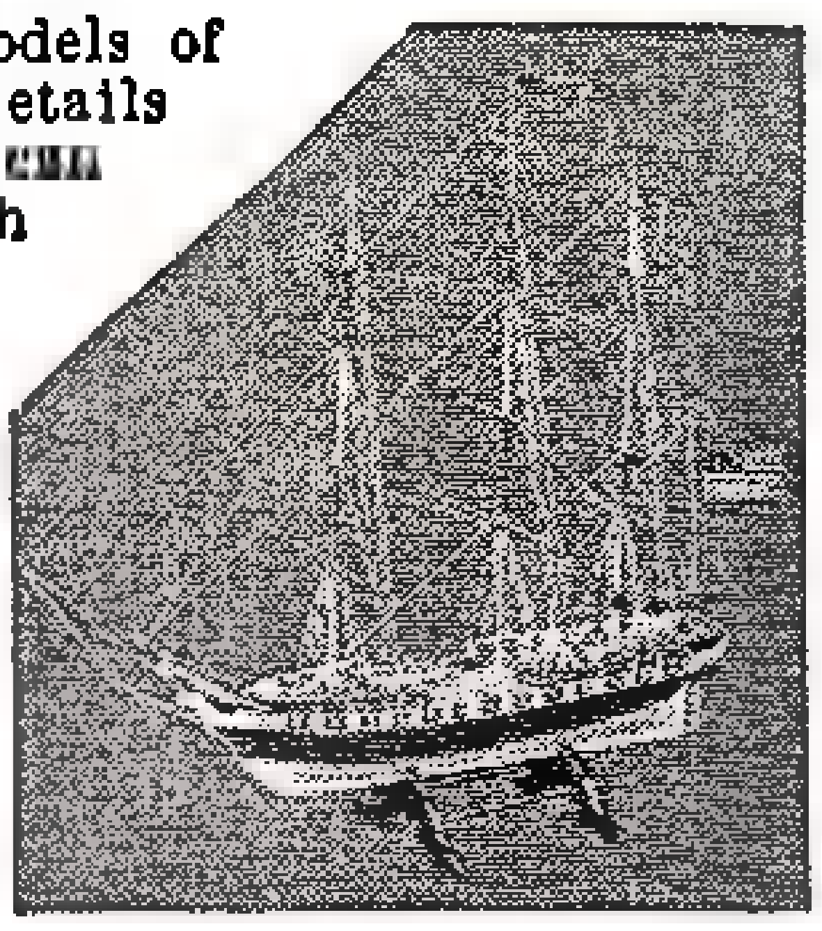

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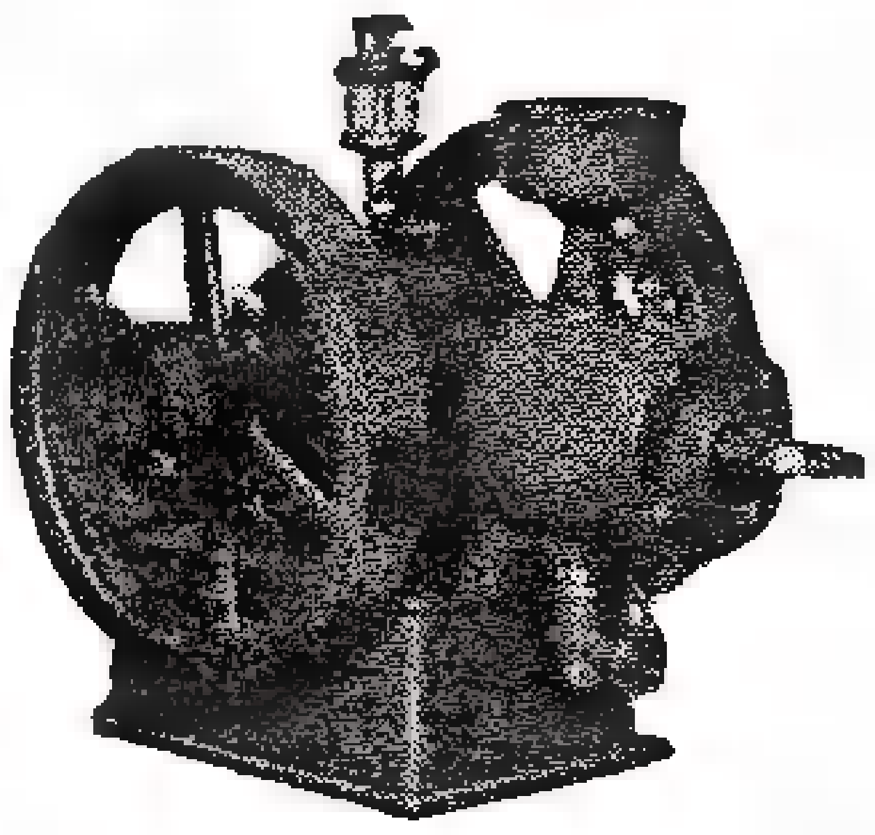

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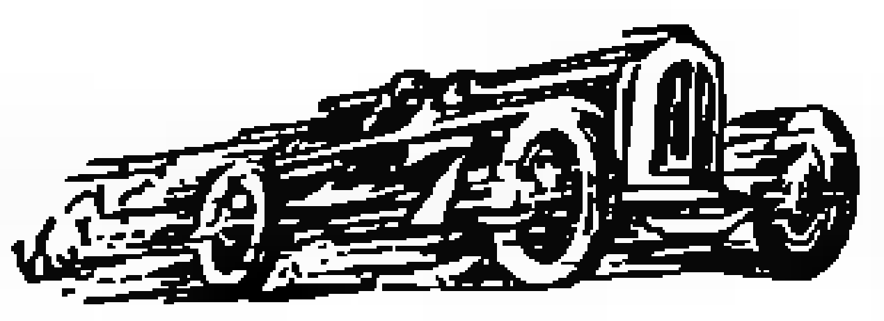

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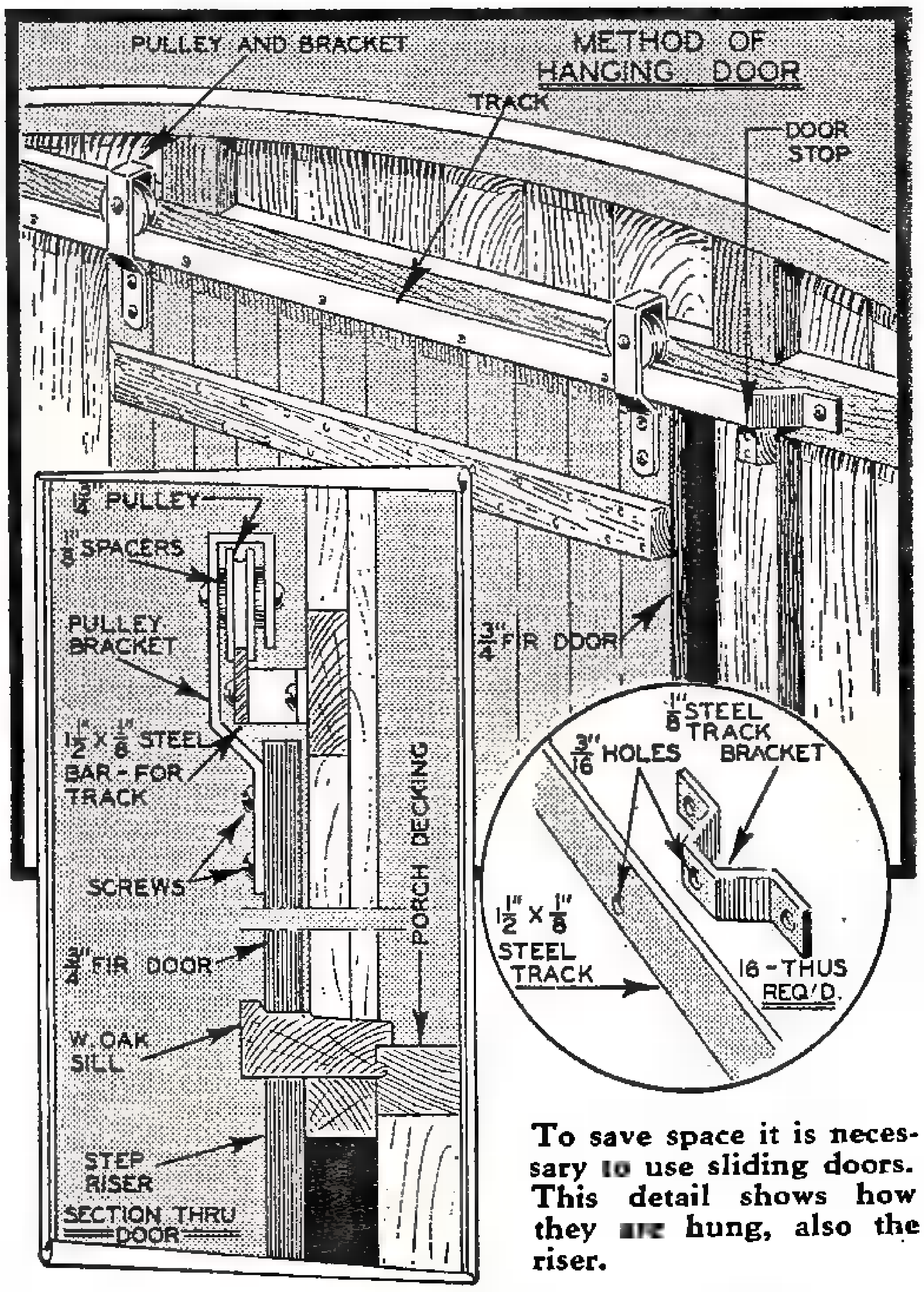
"Old Man River" — Houseboat

(Continued from page 121)



To save space it is necessary to use sliding doors. This detail shows how they are hung, also the riser.

in the water with a terrific cockeyed list.

So that leaves us with nothing but the hull to consider. If you are in the dark, that is as to house details, buy or send in to this office 15c for a copy of May M-M and the balance of the house details are made plainly evident for you. And as for the hull—

It is a simple scow box 8 ft. 2 ins. wide, 22 feet long, and 24 ins. deep. It is made by making six frames out of two by fours of the same outside plan as the sides. Then these frames are planked at the ends first with 2"x8" y. p. which are fastened with 20 d. galvanized spikes. Don't use wire nails in a boat like this. The nearest local hardware man can have ordinary 20 penny spikes galvanized, and they hold. Bright wire nails won't, and they rust out in a couple of years.

When the ends are on the hull, the thing is lined up and propped level, bottom side up. Then the bottom is planked on. Plank the bottom first, and then joint the sloping ends in last.

Then turn the hull over, put in the flooring of ¾" fir, and put in the partner and headledge pieces. Then deck in the same way you did the bottom. Nothing hard about this, is there?

Then set the house in. Ceil up around the edge of the house with moulding caulked with cotton, and the job is done.

Half inch cedar ceiling is used for the porch bulwark, same as the house is planked with, and there is your houseboat, Old Man River, ready for a couple of coats of paint—anything you choose, barn red, white, blue green or pink—as long as it has a lot of lead and oil in it. And you can slide her by skidding into the drink ready for adventure in far parts!

Build a Simple Chemical Refrigerator

(Continued from page 113)

cake of ice. Theoretically the temperature under ideal conditions would be 28° F. but practical limitations such as insulation of wood in the trays, etc., will cut our efficiency down. At that, intense cold will be produced and we can roll our summer's supply of ice up to the camp in the form of sacked, greenish white, cheap powder.

Here's how to go at building a tray that will have what is known as an "ice melting capacity" of about 10 lbs. of ice.

A varnish can is filled with little trays ⅝" deep with galvanized (non rusting) screen tacked to the bottoms. The outside dimensions of the trays should be just enough to allow the trays to fit inside the can.

The top of the can is removed cleanly with a can opener or tin snips.

The trays are dipped in hot paraffin and pulled out and swished around in the air to cool them and to shake the screen loose from clogging particles of wax. Only enough paraffin is allowed to remain to chemical proof the wood. The ammonium nitrate is very mild, and has no injurious effect, but would stain the wood and rot it if this precaution were not taken.

Then the tray bottoms are neatly covered with blotting paper.

Each tray is filled with two parts salt to three parts ammonium nitrate, which can be had from your corner druggist very cheaply. If he hasn't it in stock he'll order it for you from his chemical supply house.

An ⅛" copper tube is led from the can via a funnel to a drain. See drawing.

A water drip through another ⅛" copper tube and stop cock is arranged to drip onto the little tin roof of the uppermost tray.

All piping must be insulated, that is, the holes through the ice box must be caulked so no outside air can continue to bleed in. Also the ice box itself must be as tight as one used for ice. Otherwise we put our little doohicky to work for nothing.

Installed, the thing to do next is to put some water in the reservoir, and let 'er drip. Just enough water should fall through the nozzle to produce an occasional drip at the drain. Experiment and weather will determine this. Cold weather requires less water than hot weather.

The salt will keep the nitrate from caking. At the end of about 30 hours the trays will be saturated, and will lose their cooling power. Then they are placed in sunny spot to dry, as a new set of trays are slammed into the cooler. Takes but a few seconds attention every day, and is far less work than hauling ice.

Eventually the ammonium nitrate will be reduced in quantity through evaporation, and the trays will have to be restocked. If you save the drain water you'll recover most of the nitrate by boiling it out. At prevailing prices, the cost of the nitrate is about the same as that of ice. In out of the way places it is much more convenient, and there is no mystery about it. Anyone can build and run one. Larger sizes can be built for larger boxes.

The larger the trays, the more nitrate evaporated and the more food cooled. All very simple.

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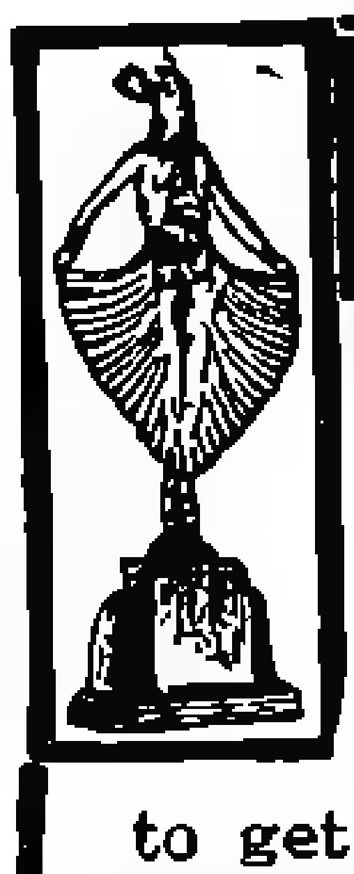

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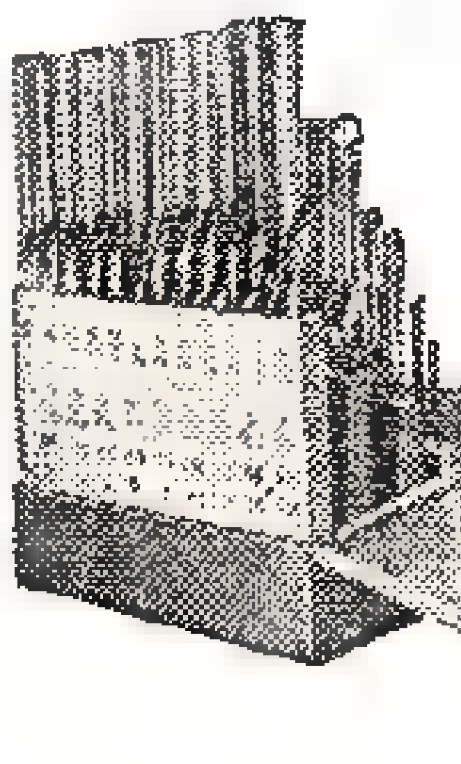

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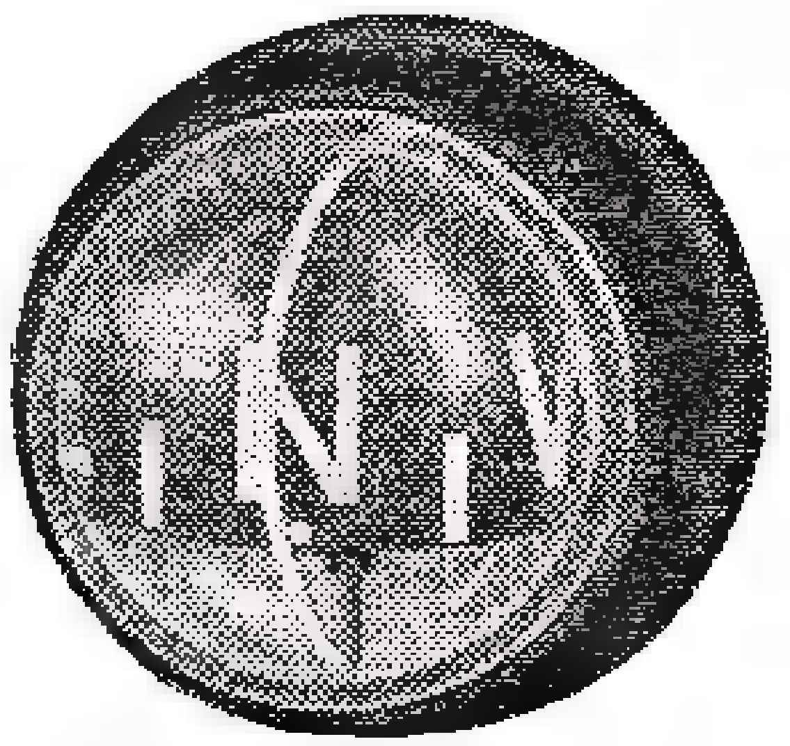

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Build A "Desert Town" Canoe

(Continued from page 94)

end pieces. Stranded copper radio antenna wire was used and is much the most satisfactory. However, solid soft copper, brass or soft galvanized iron wire, about No. 14 B & S gauge or the size of ordinary baling wire, will do. The same wire used in wrapping and bending the gunwales, about 12' in all, was more than sufficient for completing all the permanent ties in the canoe.

The spreaders, one at the center 2' 9" long and one at each rib B 2' 3½" long (Fig. 5) are made from two wood lath smoothed down and nailed together with lath nails, cleated over. Fig. 6 illustrates the position occupied by the spreaders directly below the gunwales. The center spreader is provided with an upright from the keel. This upright is made from two thicknesses of lath 11" long nailed together with 1" lath nails and bound in place by wire ties as indicated. The wire ties are necessary rather than nails due to this member being both a thrust and tension member alternately. The center spreader serves the double purpose of bracing the canoe and of furnishing a center of balance hand hold for lifting and handling. This spreader is placed first to furnish fastening points from which to form the gunwales. Fig. 6 indicates the method of fastening the center rib, the spreader, and the center of each gunwale together. Two 1½" wire nails are passed through holes bored through the gunwales and the center rib and bent over on the outside of the rib. Two 1" wire nails are driven through the gunwale downward into the spreader, and two 2" finishing nails are driven through the rib into the ends of the spreader. Wire ties may be substituted through holes drilled in each case but nails were found satisfactory. A small hand awl, made from an old ice pick sharpened to a wedge point was used in boring all the holes required throughout the job. Nails larger than those specified should not be used as the thickness of the gunwale does not permit of weakening with heavier ones. Care must be taken not to weaken the gunwales at this point by bruising as this will cause the wood to bend sharply, spoiling the smooth curve. All holes should be kept as small as practicable. As an aid in holding the members together while fastening permanently, the different parts were tied in place temporarily with soft copper wire ties. Twine may be used but it is a little more clumsy to handle.

Next trim the ends of the gunwales to fit in place one inch below the tip of the bow-pieces, bore two holes through the ends and through the bow-pieces and tie permanently with wire ties as indicated in Fig. 7. Draw the ties as tightly as is practicable and twist the ends together with pliers. A wire binding was placed over the ends of the gunwales to insure against splitting.

Now temporarily bind each rib to the outside of the gunwale with wire or twine, readjusting by sight for any apparent irregularities in symmetry of form. Do not fasten any of the ribs permanently except the center rib as this will prevent adjustments in the shaping when the longitudinal strips of screen moulding are placed.

Invert the frame over a box or other support and temporarily tie into place the longitudinal screen moulding strips marked X, Y, and Z in Fig. 6. As the strips are a little longer than the canoe, the ends may be held in place temporarily as at A, Fig. 7. Both sides of the canoe should be worked together to insure symmetry. These three strips are placed first as they will reveal the adjustments necessary in the ribs to secure smooth, even contours. No nails should yet be used in placing any of the strips or in fastening the ribs but twine or wire ties should be placed at each intersection of strips and rib.

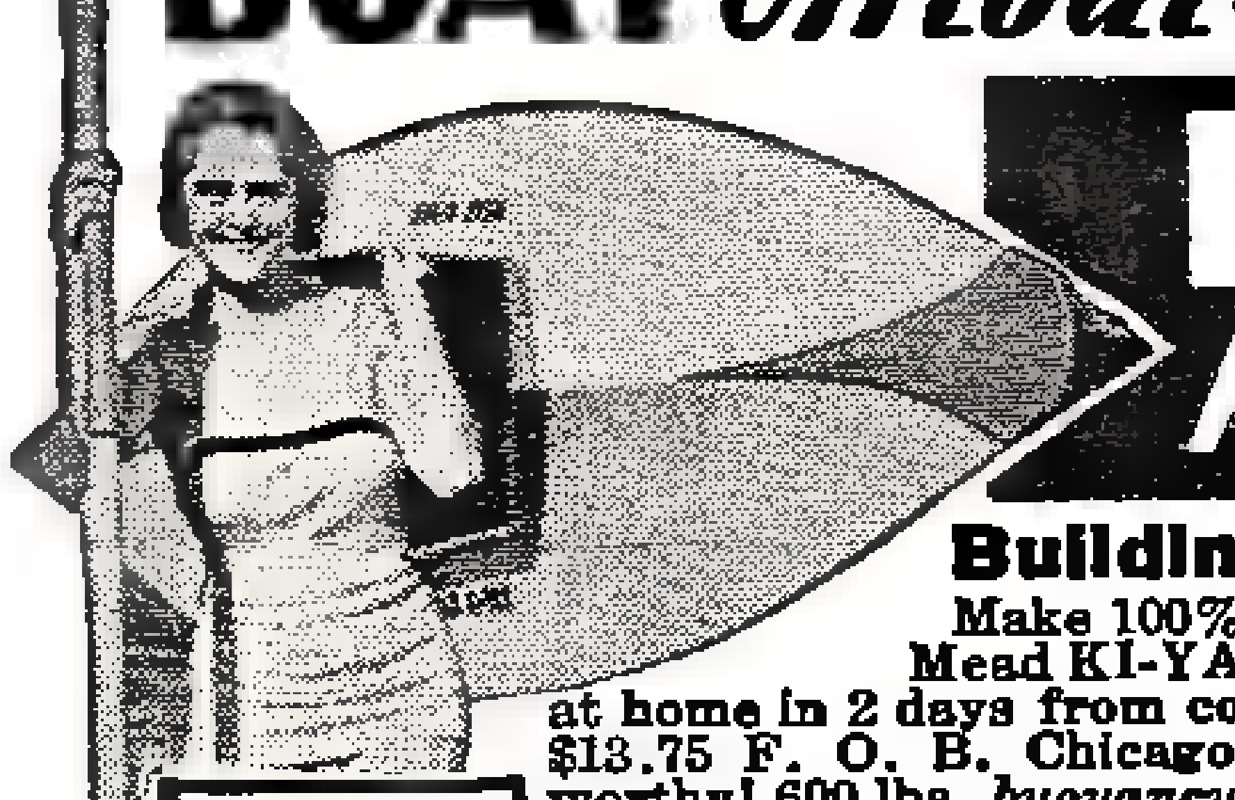
After all irregularities have been eliminated by slipping the intersecting members about in their ties, the distance from the keel along the outside of each rib to the top of the gunwales should be checked with the corresponding opposite side to prevent a warped appearance. Turn the frame right side up, and with a 1/16" drill or hand awl (the ice pick was used here) drill two holes, spaced about 1", through the ribs and gunwales. 1½" wire nails thrust through these holes and cleated down across the grain on the outside of the ribs furnish strong joints. Use an old flat iron, sledge hammer, or similar backing in driving and cleating all nails as the frame is too light to furnish sufficient resistance. Cut the ends of the ribs off flush with the top of the gunwales, and touch these nailed joints with linseed oil or paint to retard rusting and checking of the wood.

Invert the frame, check the spacing of the longitudinal strips and nail them to the ribs with two ¾" wire nails, cleating over on the inside. Cut the ends of the strips to fit snugly to the inside of the bow-pieces and bind as indicated at B, Fig. 7. Chamfer the inside of the tips to prevent the formation of bumps along the bows. The wire ties used in holding these strips to the ribs can now be removed and reused in placing three of the other intermediate strips on each side, and so on until all nine strips have been placed. The frame will now appear as shown in photographs B, C, and D.

Fig. 5 indicates the method of laying the floor with 4' wood lath, planed smooth and chamfered on the top sides. Use 1" lath nails bent over where they protrude.

No seat rail was provided as seats were not found necessary. However, the rails may be provided by placing ¾" x ½" strips, similar to the gunwales, along the inside of the ribs just above the longitudinal strips X. The style and spacing of the seats being dependent on the requirements of the individual, no attempt is made to specify in this regard. Experiment indicates that the rear paddle seat should be placed just back of rib C, and the front paddle seat between ribs C and B. The middle or "passenger" seat is best located with its back against the rear spreader at B. Wood lath smoothed down makes excellent material for building the seats. About twenty-five additional lath will cover. Each seat should be furnished with supports from the keel similar to the support at the center spreader. This will reduce the necessary weight of the seats and distribute the load more evenly to the sides and keel.

Two of the four remaining 14' strips of screen moulding should now be placed in water to soak. If a trough, ditch or pond long enough to accom-



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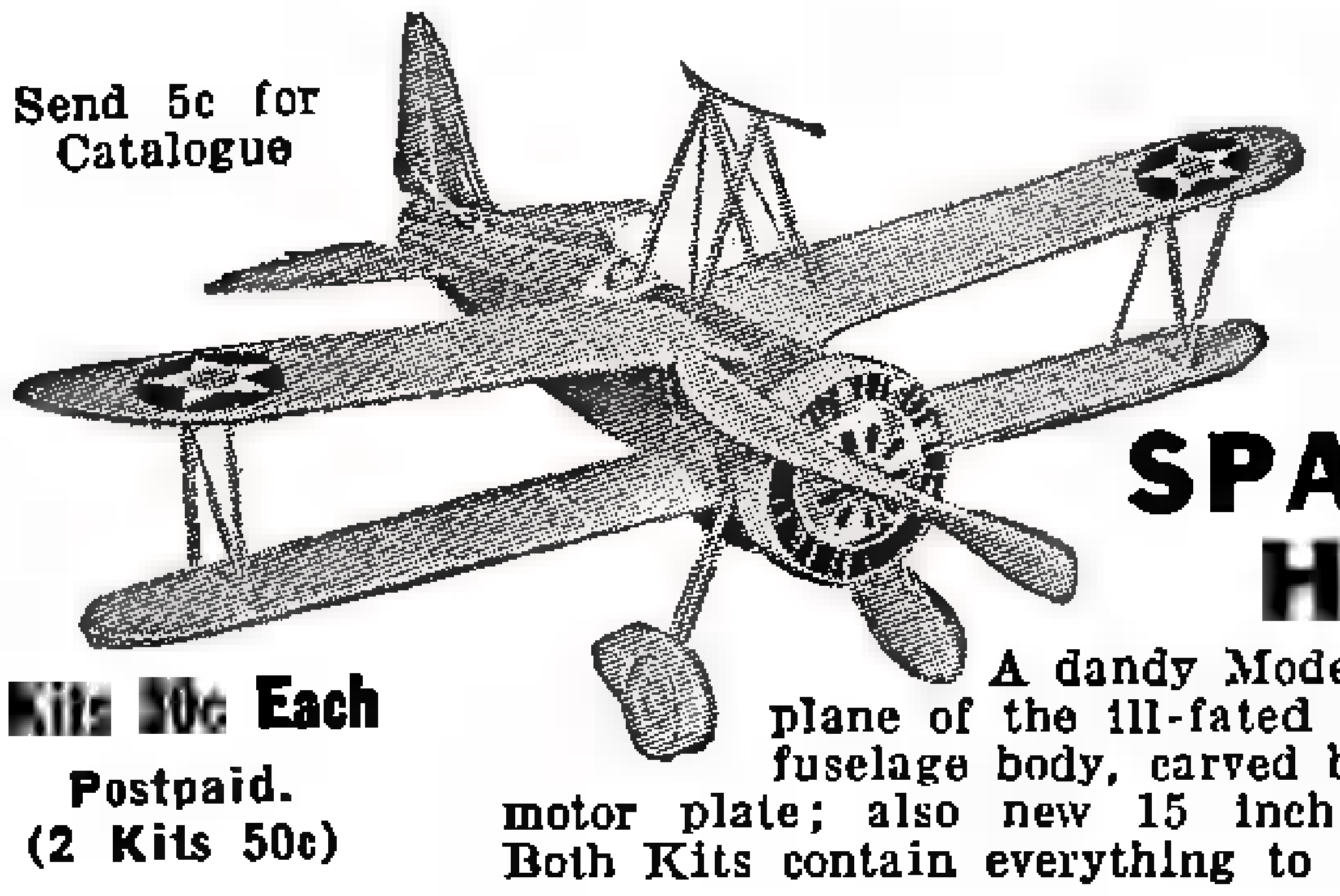

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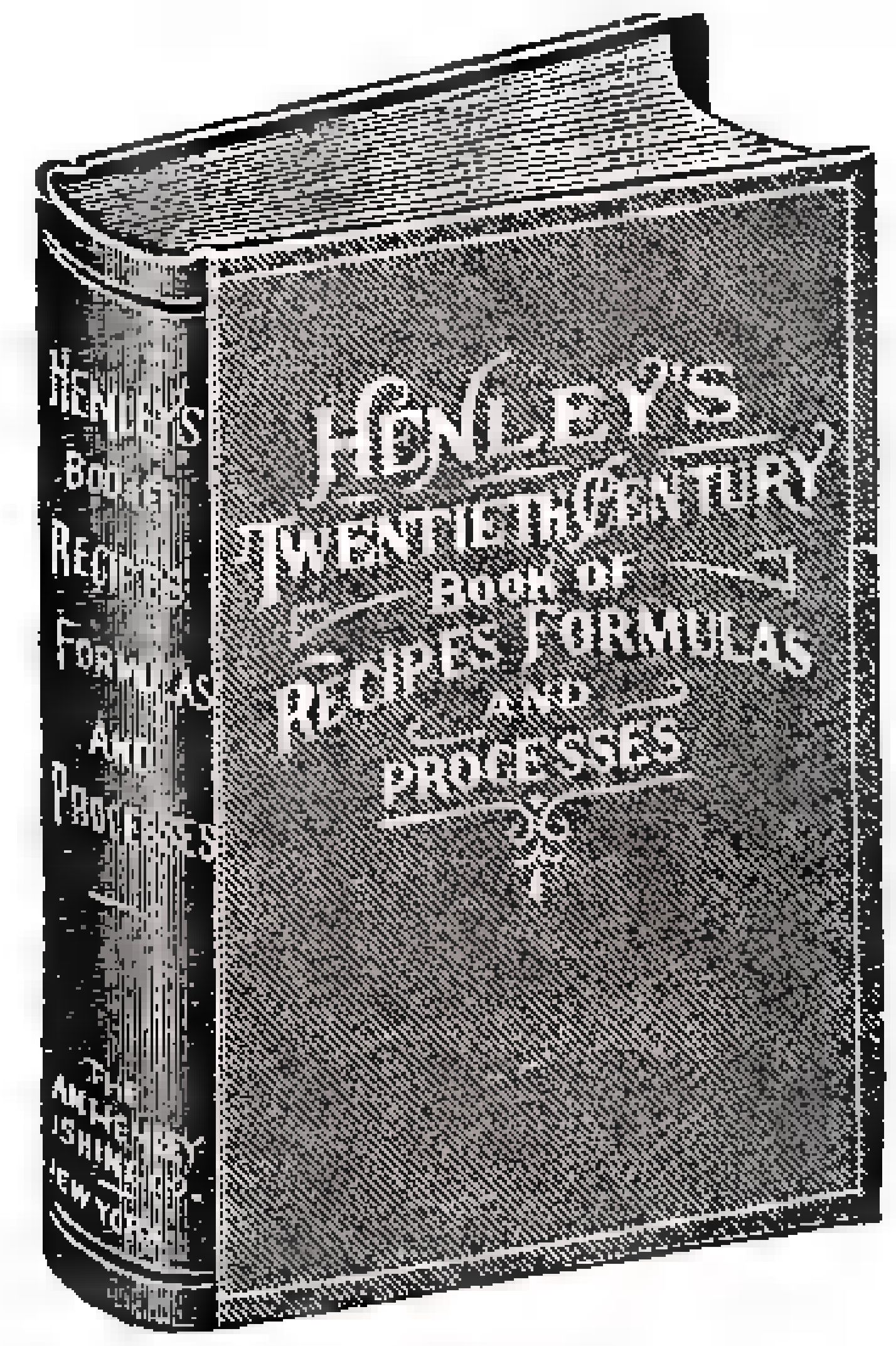
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Build a "Desert Town" Canoe

modate the full length is not convenient, it will do to weight the center and allow it to sag into a smaller pool or trough. These strips are to finish off the top of the gunwales after the covering has been placed.

The frame is now ready to cover. Medium weight tent cloth or canvas, sufficient to make a piece 14′ x 5′ 8″ will be necessary. A five year old, medium weight camp tarpaulin was used in this case and has proved more than strong enough. Back porch curtains, old tents and similar cast off sections of canvas can all be made to reduce the cash outlay, provided the material is carefully inspected and all rents sewed up with feather stitching and doped with "Duco Cement," Ambroid, or airplane dope (all similar compounds), or in the absence of these, with several treatments of paint. Small holes and thin places are easily strengthened by two or three applications of the "dopes" mentioned. These can be procured at hardware stores, automobile top repair shops, airplane supply points or airports. Duco Cement is sold in convenient tubes for a few cents. Less than half a tube was used in doping a foot-long tear and a dozen small holes and thin spots. Ambroid, or airplane dope, is sold by the gallon. If you are fortunate enough to live near an airport, you may wish to secure enough of the dope to paint the whole covering, in which case a much tighter covering could be obtained due to the shrinking of the dope.

In making up the 14′ x 5′ 8″ cover from separate pieces, ½″ lap seams with two rows of stitches should be used. Sufficient new canvas to cover the canoe will cost approximately three dollars at retail prices. Fold the canvas evenly down both centers as indicated in Fig. 8, and mark the folds with chalk, pins or soap. Invert the canoe frame over a box or other support, and place the canvas over the frame, making certain that the long center mark lies along the keel and the short center mark lies along the middle rib as indicated by dotted lines in Fig. 9. Tack temporarily along the keel at the three points shown. The two remaining 14′ strips of screen moulding are now nailed over the canvas along the sides of the keel ¼″ from the bottom of the keel, Fig. 9. Use 1″ nails at intervals of about 1½″. Tack the canvas temporarily at the five points along the gunwales as shown and turn the canoe right-side-up. Trim the covering to within three inches of the gunwales and to one inch of the bow-pieces. Starting at the center rib, fold the canvas double and tack to the underside of the gunwales with No. 2 tacks at intervals of three inches, see Fig. 10. The temporary tacks will be found to be causing wrinkles as you go along and should be removed. If a little care is exercised in stretching the wrinkles out in working toward the ends from the center, the covering will go on smoothly. The canvas is tacked to the bowpieces last by doubling the extra cloth back on the inside so that when stretched tightly the folded edge will just cover the front side of the bow. Tack at 1″ intervals starting at the keel, and take up the slack in the fold caused by the curve of the bows a little every three inches.

The finishing strips for the gunwales have been soaking and should now be quite pliable. They are nailed, flat side down on top of the canvas to the top side of the gunwales. Nail each at the center with one 1" lath nail, and temporarily tie the ends of the strips to the tips of the bows to hold in place while working. The nail at the center of each strip may tend to pull out under the strain of bending. If it does clamp the strip to the gunwale with a small clamp or wide mouthed pliers with handles held together with twine or tape. Nail the strips to the gunwales at intervals of 6" with 1" finishing nails up to the point of upward curve. A clamp helps at the curved point, also. 1" lath nails should be used at the upward curve as the pull will tend to draw the small heads of finishing nails through the wood.

There are left two of the narrow pieces of hoop formed for the bows. These are smoothed and rounded on the outside, drilled and countersunk at about 5" intervals and screwed with 1" flat head wood screws to the bows over the covering as shown in Fig. 11. Holes for the screws should be drilled into the inner bow-pieces to prevent splitting.

Fig. 9 indicates the method of placing a short sheet brass, copper, or galvanized iron strip about a foot long over the joint of the finishing bow-pieces and the keel. The metal strip may be continued along the full length of the keel to prevent wear from scraping, but the short length serves well enough for protecting the portion of the bow and keel that strike the shore when beaching.

Following is the list of the materials needed for certain parts, and what the cost of them was found to be in the vicinity of El Paso, Texas.

	Approx. Cost
Ribs and Bow-pieces—6′ Barrel Hoops—10	$0.50
Keel—White Pine—1¼″x¾″x12′ — 1	.23
Gunwales—White Pine—¾″x½″x12′— 2	.23
Frame Strips—White Pine—Flat Screen Moulding—¼″x⅝″x14′ —22	2.45
Floor, and Spreaders—4′ Wood Lath—25	.25
Covering—Medium Weight Tent Cloth or Canvas—14′ x 5′ 8″	3.00
Nails—6D, 70 (for Jig); 1″ Lath Nails, ¼ lb.; 1″ Brads or Finishing Nails, ¼ lb.; ¾″ Wire Nails, ¼ lb.; 1½″ Wire Nails, ¼ lb.; 2″ Finishing Nails, ¼ lb.; No. 2 Carpet Tacks, 100	.30
Screws—1″ Flat Head Wood—12	.05
Paddle—White Pine—6′x1¾″x6″—1	.70
Paint—"Outside" or "Duck" ½ gal. thinned with 1 qt. Turpentine	2.45
Permanent Wire Ties—Stranded Copper Radio Antenna—12′	.06
Temporary Ties—Wrapping Twine of No. 20 B & S Gauge Copper or Soft Iron Wire—25′	.15
Total	$10.37

Two coats of good "outside" or "deck" paint (½ gal. thinned with 1 qt. turpentine) on the outside and one coat on the inside will ordinarily make the canoe water-proof. A primary coat of the airplane dope will greatly reduce the amount of paint required, and will make the covering shrink to a drum-like tautness. However, the dope may not be convenient to obtain, and the cost will more than offset any saving of paint. When the paint is thoroughly dry, a trial in the water will reveal any small leaks, which may be filled with paint.

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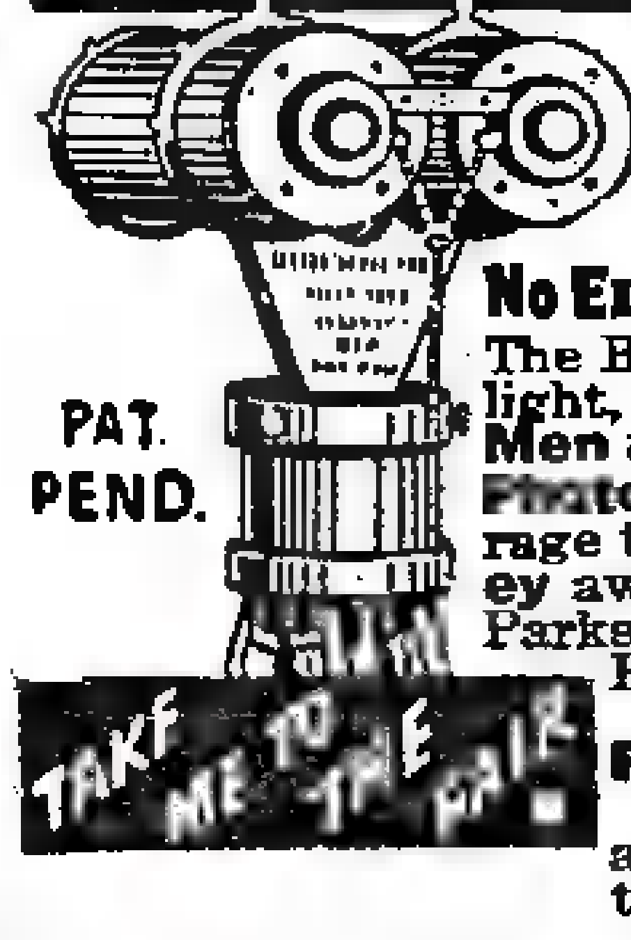
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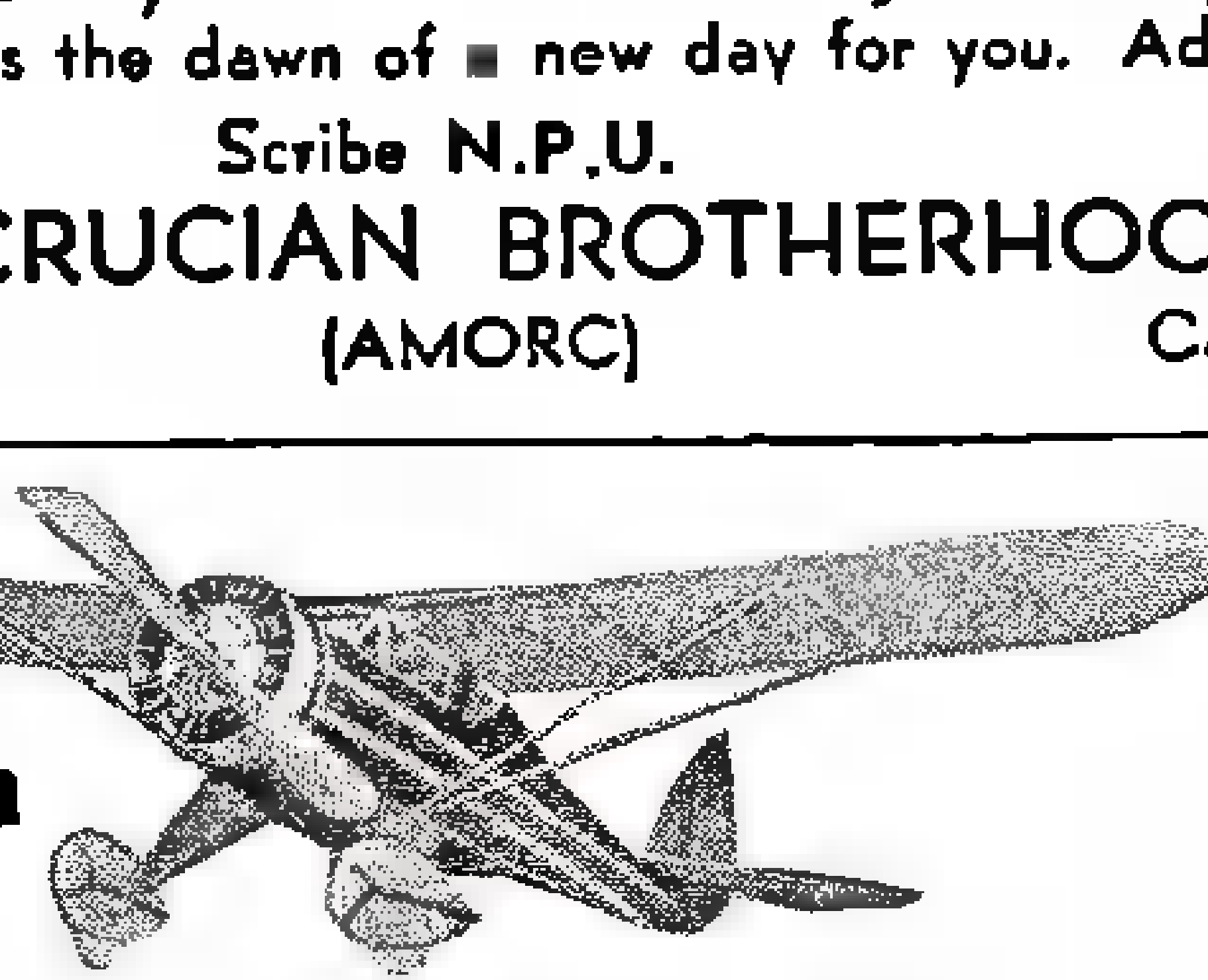

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28x4.75 19	2.20	0.95
29x4.75-20	2.25	0.95
29x5.00-19	2.60	1.05
30x5.00-20	2.60	1.05
28x5.25-18	2.65	1.15
29x5.25-19	2.75	1.15
30x5.25-20	2.75	1.15
31x5.25-21	2.95	1.15
28x5.50-18	2.95	1.15
29x5.50-19	2.95	1.15
30x6.00-18	2.95	1.15
31x6.00-19	2.95	1.15
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Sports Model Sidecar Easy to Build

(Continued from page 97)

Now for the upholstery. First, make a single panel for the back section, well padded, to fit down in place in the body. The sides of the passenger seat should be lined with cardboard, covered with a thin layer of upholstery wool, and then covered with Fabrikoid, of the same material used in covering the back.

The bottom seat can be an old automobile cut down to fit.

To finish off the job a neat airplane type windshield may be constructed of a large single piece of thick celluloid, such as is used in airplanes. Any airplane supply house will be glad to supply you with this material.

When the body is complete it should be mounted in place on the two cross members which will be on the chassis.

Midgy Jr.—Cigar Box Receiver

(Continued from page 101)

For use in a car equipped with spark suppressors, use the car frame as a ground and run the antenna wire out the window to a pole lashed to the side. In a canoe or other boat trail the ground wire in the water and fasten the antenna to the mast or fishpole.

In camp, the well pipe can be used for grounding and an antenna erected in the usual way.

Now that the tubes are lighted you are ready to tune in. Rotate the tuning condenser with the lever, at the same time advancing the variable resistor until a hissing is heard in the phones. This should come in gently. If it plops in with a thud try a higher resistance grid leak (or a different one) or reduce the number of tickler turns on the coil.

When a station is heard the regeneration should either be increased or backed off until the signal is at maximum without the set going into oscillation.

The circuit uses the following parts:

Midget book type balancing condenser,
.000050 variable midget tuning condenser (Pilot or similar),
.0001 fixed condenser, (grid condenser),
.00025 blocking condenser,
7 to 9 megohm grid leak,
8 ohm filament resistor,
50,000 ohm variable regeneration resistor,
Small 3½ to 1 ratio audio transformer,
Two 230 type 2-volt tubes,
Pair of phone tip jacks,
A battery—two cells of flashlight battery, (2⅜x1⅜ inches), 5 cents each,
B battery—Burgess portable 22½-volt B or C battery measuring 3 5/16 x 2 1/16 x 2⅝ inches.

Trailer Carries Portable Cabin

(Continued from page 99)

To finish the sides, fasten the four hinges to each corner, evenly spaced as shown. As the accompanying sketch shows, the side studding is offset upward 1 inch. The projection of this studding at the top of the sides fits into the notches in the rafters of the roof and locks studding and rafters together.

At this point turn the ⅜-in. diameter, 4 in. long, lag screws into the corner posts and the two 2 by 4 in. studs. Turn the screws in until 1 or 1½ in. besides the heads protrude, then cut off the heads with a hack saw.

With these pins in place, stand one side in place along one side of the floor and after making sure that the side is properly aligned, mark around the pins, then lay the side away and bore ⅜ or 7/16 in. holes on these spots at least 1 in. deep for the pins to fit into later. The other side is made in the same way but reversed.

The illustration of the roof shows partial views of both the top and bottom. The rafters are 2 by 4 in. pieces spaced to coincide with the side studding. After completing the roof, turn it over and set it at the angle it will assume when on the cabin. In this position nail roofing paper, then fasten the canvas strip along the ridge with a little slack at the actual ridge. Use large head roofing nails for this. To finish, heat asphalt until it pours, then spread it over the canvas. When cold, fasten the hinges, one to a pair of rafters as shown.

These various units are best transported on a trailer. You can get Ford front wheels and axle and make one for this special purpose at very low cost. To bind the units it is suggested that you obtain two 2 by 4 in. pieces of suitable length and four long bolts, say ⅜ in. in diameter, and use the method shown.

Ride Wooden Seahorse 5 M. P. H.

(Continued from page 114)

and these should be drilled and bradded in place so that the head can be mounted without a lot of fancy juggling.

Two pieces of 12-in. and one piece of 4-in. stock make up the body proper, together with a strip of lattice to gain additional clearance for the working mechanism.

Bicycle parts make up the driving mechanism, with a few changes to fit the job. First on the list is the crank hanger. This must be cut in two since the original is not wide enough to span the two sides. The extension is made by slipping a ½ by 3½-in. pipe nipple over the cut crank, welding it in position.

The other end of the crank is fitted with a ½-in. pipe coupling, likewise welded. Of course, the nipple turns into the coupling, and everything is made fast by means of a suitable metal pin.

For the sprocket arrangement, take a 3-in. length of ¾-in. pipe and fit a ¾-in. waste nut to one end. Slip this through the sprocket, fitting bolts through the waste nut into the 2 in. thick hardwood cam which goes on the opposite side. You are then ready to mount the hanger between the wooden side pieces, using the original bearings.

There is nothing very difficult about the paddle wheel. You will use a non-coaster, rear bicycle hub, recessing this in two hardwood blocks as shown in the drawing. The paddles are fitted around in regular order and should be securely screw-fastened. The mounting for the paddle wheel consists of a rear bicycle fork, cut to the desired length and flattened out so that it can be bolted into place.

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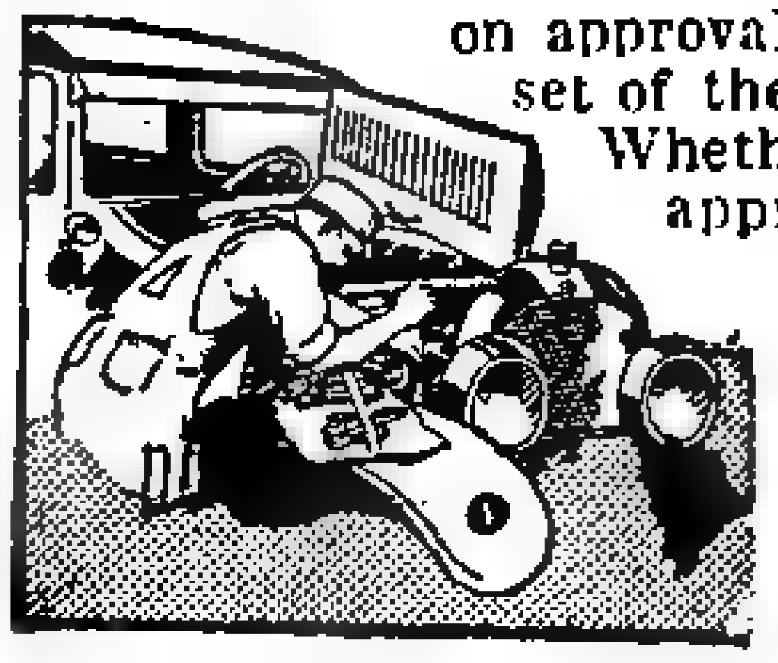

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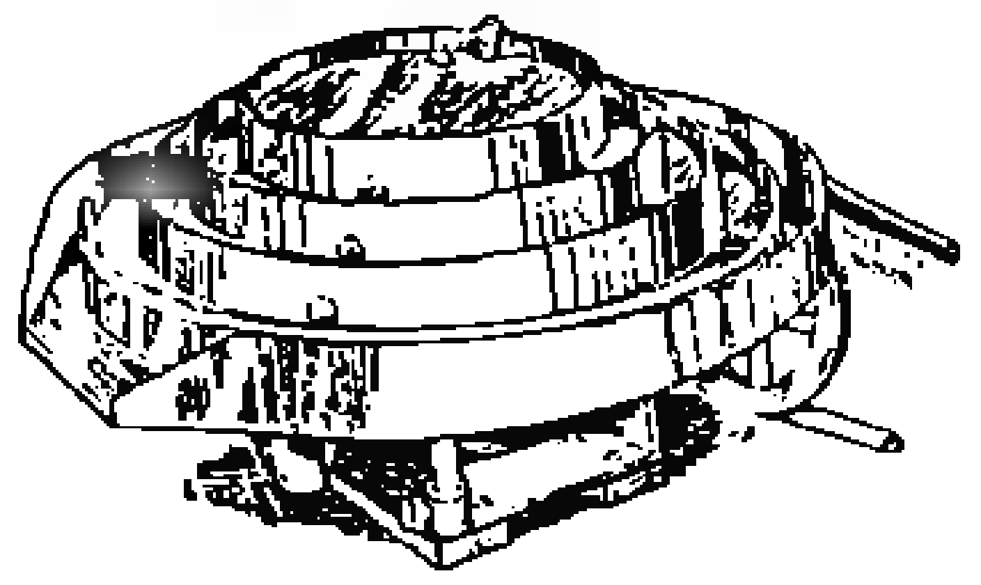

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Fortunes Waiting for Inventors

(Continued from page 85)

chanical or electrical device that will automatically close a window in the case of rain.

18. A window that can be opened from the left, right, bottom or top to accommodate the wind. In other words, a window so hung that it will be universal.

19. An electric wall and ceiling washing machine that can be operated by a housewife and that will not drip. It should wash and dry as it went along.

20. A dog muzzle that will prevent a dog from barking and yet meet the S.P.C.A. specifications.

21. If an inventor can develop a simple little device that will prevent the shoulder straps from ladies' undergarments from slipping off the shoulder, he will never have to worry about income for the rest of his born days. Twenty million such devices could be sold in the United States alone during the first year.

22. A new method of attaching collars to shirts eliminating the well-known and thoroughly despised collar button.

23. An automatic cloak room for public places where people may hang their coats and lock them into position using a simple key for their removal. This amounts to a lock-hook of simple construction so that a garment would have to be destroyed before it could be removed.

24. A simple little kitchen device that will shell peas quickly. It should sell for a maximum of twenty-five cents.

25. A simple thermo-static control that can be applied to old fashioned gas ranges in connection with the oven.

26. A cheap alarm for rural mail boxes that will ring a bell in the house for an instant and then stop.

27. A lip-stick holder that will feed the stick out only as fast as it is used. It should be unnecessary to pull the stick out each time it is used as is now the case. When one considers the fact that twenty millions of these things are sold yearly in the United States alone, one will see the great profit that would result from such a scheme. A penny a piece royalty would make a man $200,000 a year.

28. A cigarette case that will contain a tiny humidor to keep the contents fresh and moist.

29. A self-watering flower or plant pot that will make it possible for growing plants to be supplied with water over a period of a month.

30. Some kind of a simple device made of fabric that can be sewed inside the knees of men's trousers that will prevent them from bagging at this point. If the method was good enough

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New Uses for Microphone

(Continued from page 70)

ports it automatically to the officers on the bridge.

If the hull is injured and water begins pouring in, the microphone reports the noise loudly on the bridge. Thus ship's officers know the condition of every compartment at all times. Any leak big enough to endanger the ship, conveys a significant microphonic sound to the bridge.

In future war, sapping and mining operations will be prevented by alert microphones buried in the earth, which will report all sounds of military digging.

Thanks to the "mike," large concerns can speed up their stenographic departments. In a Los Angeles office building, a central stenographer takes dictation from many offices over a microphone circuit. A red light gleams if a door in one of the offices she serves is opened. If the man is out, she, many floors below, calls over the microphone, "Mr. Simmons is out; he will return at 3 o'clock. Will you wait, or shall I tell him you called?" The visitor speaks into the microphone and expresses his wishes. Thus one receptionist serves many offices.

We are familiar with the use of the microphone in automotive mechanics. Microphones placed alongside, or even inside, engines, report by sound to the expert automotive worker just what condition the engine is in.

Other microphones, placed at mechanical apparatus in factories, report to superintendents the activity of the machinery.

In California oil fields which have been sealed in accordance with the new regulations governing conservation of oil, the movements of the oil deep in the earth are reported by microphone. If an adjacent field, lower in level, has not been closed in accordance with the regulations voluntarily accepted by the companies, the flow of oil to the field which is cheating can actually be heard over the microphone.

The new condenser microphone, operating over a dural diaphragm placed in front of a gas chamber, was considered the finest microphonic development, until good old carbon again came to the fore with improvements in its design. The two types are now running nip and tuck. The carbon, carefully selected granules of anthracite coal, is placed, like the gas chamber of the condenser microphone, behind a gold-plated dural diaphragm.

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29x5.00-19	2.60	1.05
30x5.00-20	2.60	1.05
28x5.25-18	2.65	1.15
29x5.25-19	2.75	1.15
30x5.25-20	2.75	1.15
31x5.25-21	2.95	1.15
28x5.50-18	2.95	1.15
29x5.50-19	2.95	1.15
30x6.00-18	2.95	1.15
31x6.00-19	2.95	1.1[illegible]
32x6.00-20	3.00	1.2[illegible]
33x6.00-21	3.20	1.25
32x6.50-20	3.20	1.35

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32x4	2.75	0.85
33x4	2.75	0.85
32x4½	2.95	1.15
33x4½	2.95	1.15
34x4½	2.95	1.15
30x5	3.25	1.[illegible]5
33x5	3.25	1.45

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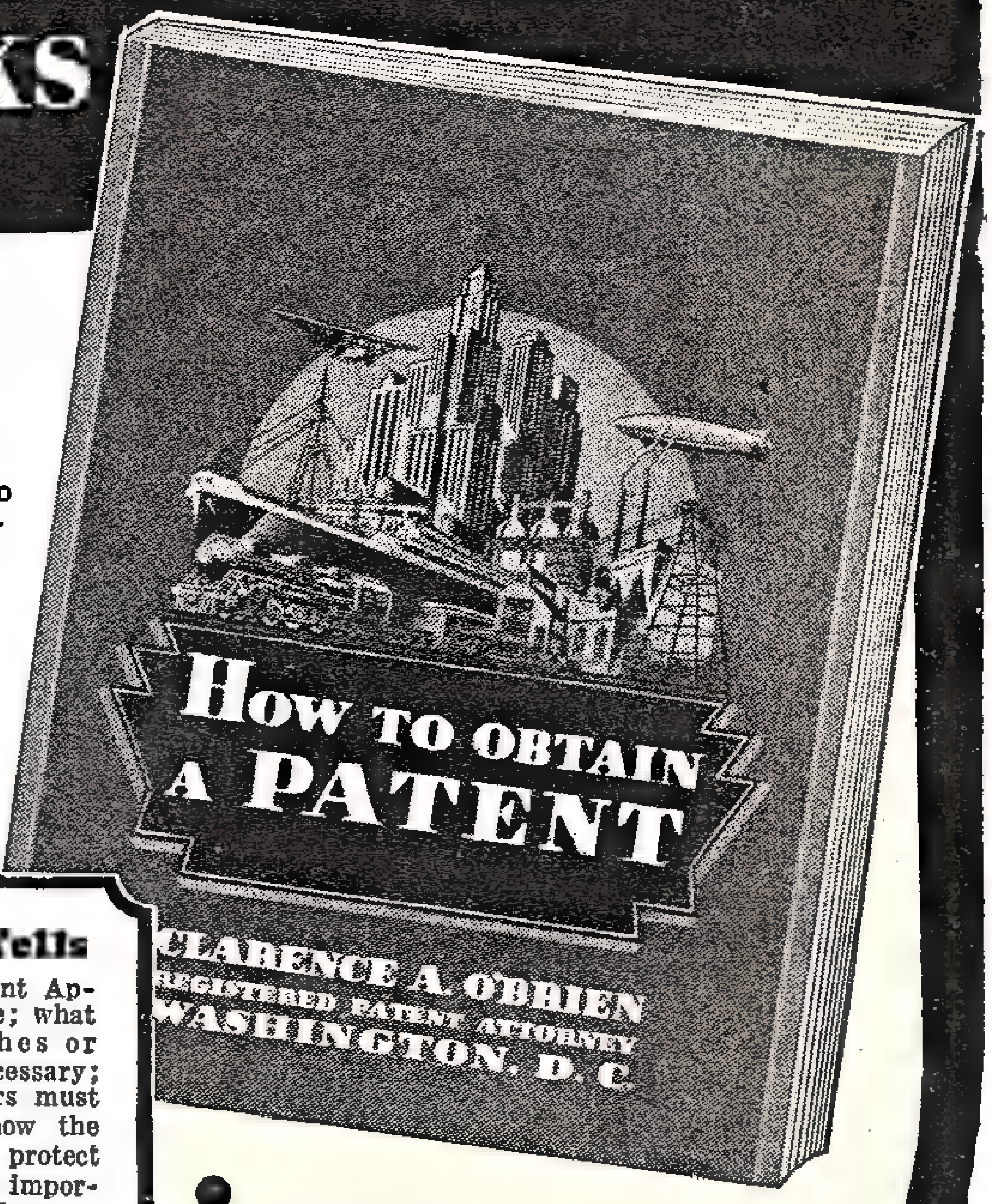

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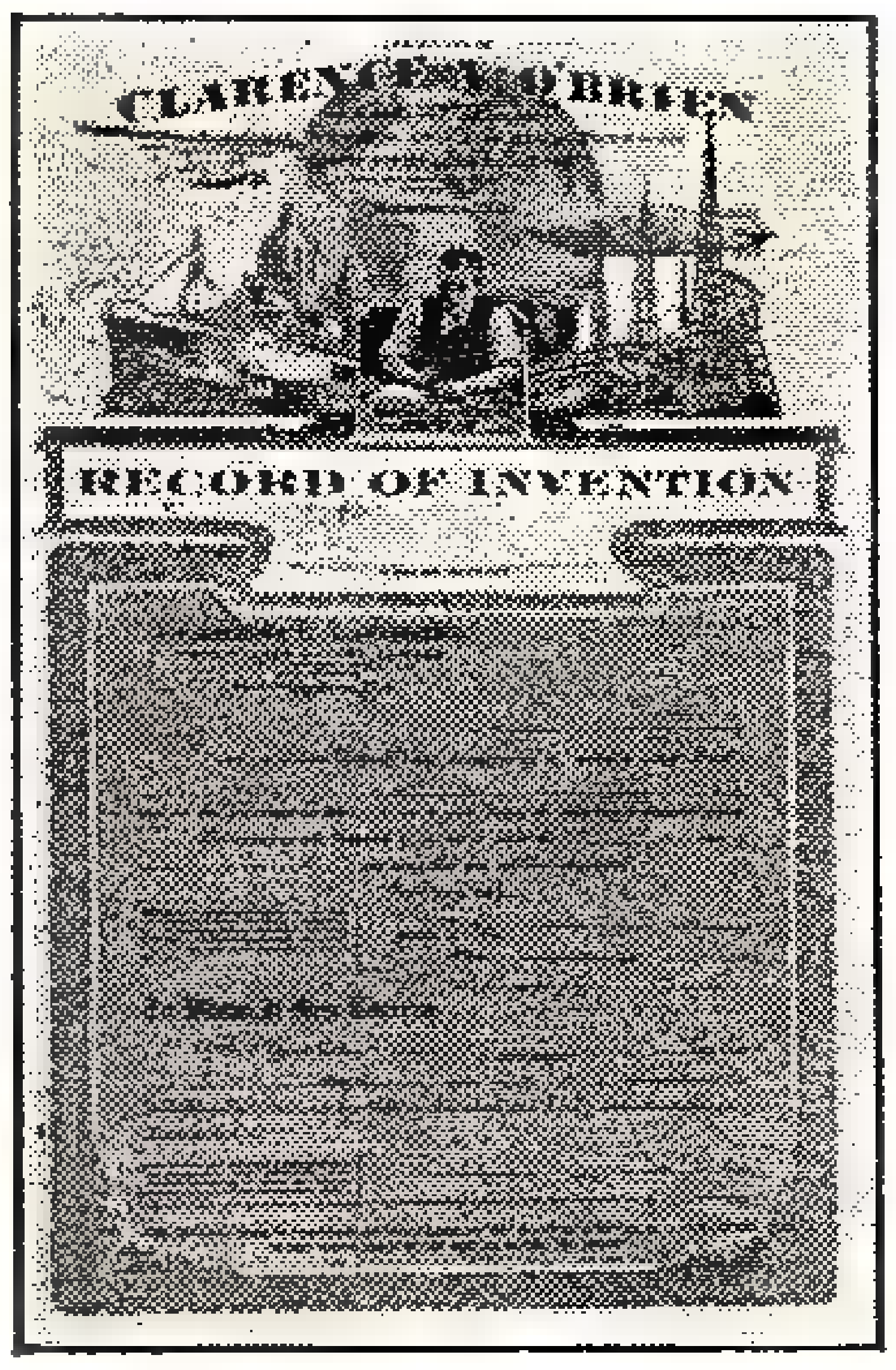

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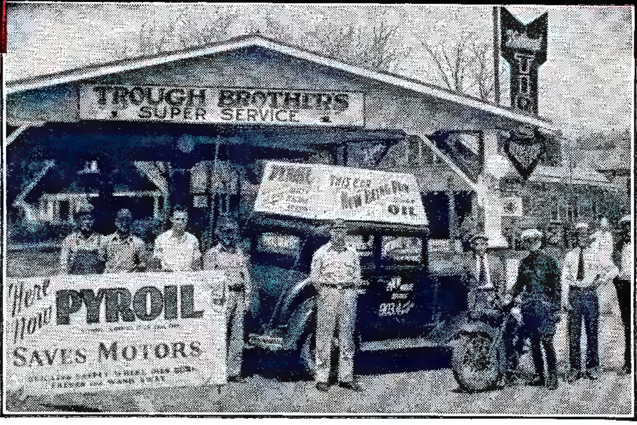

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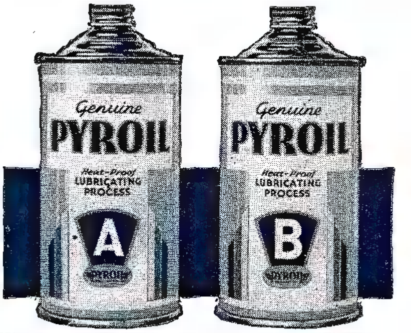

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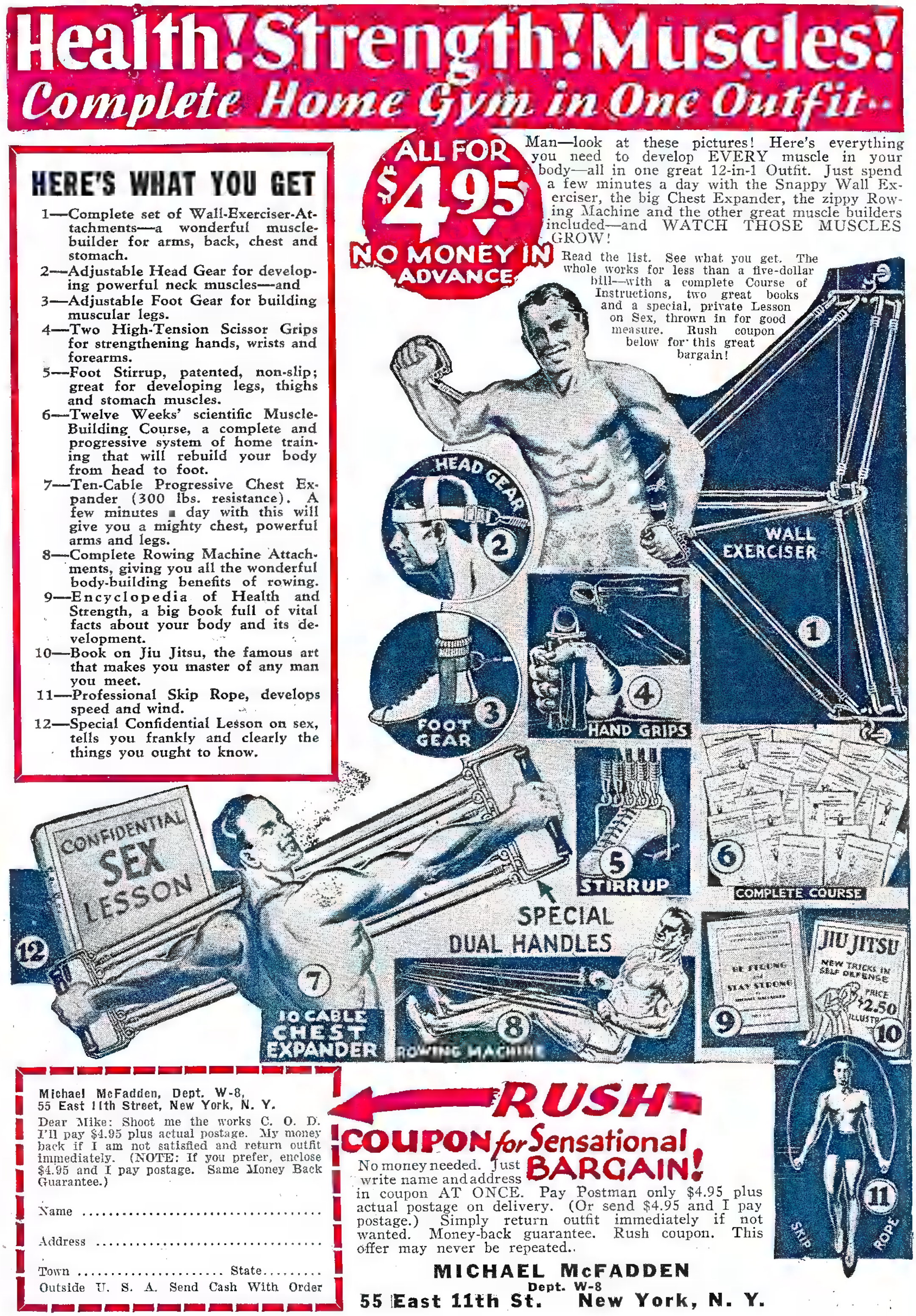

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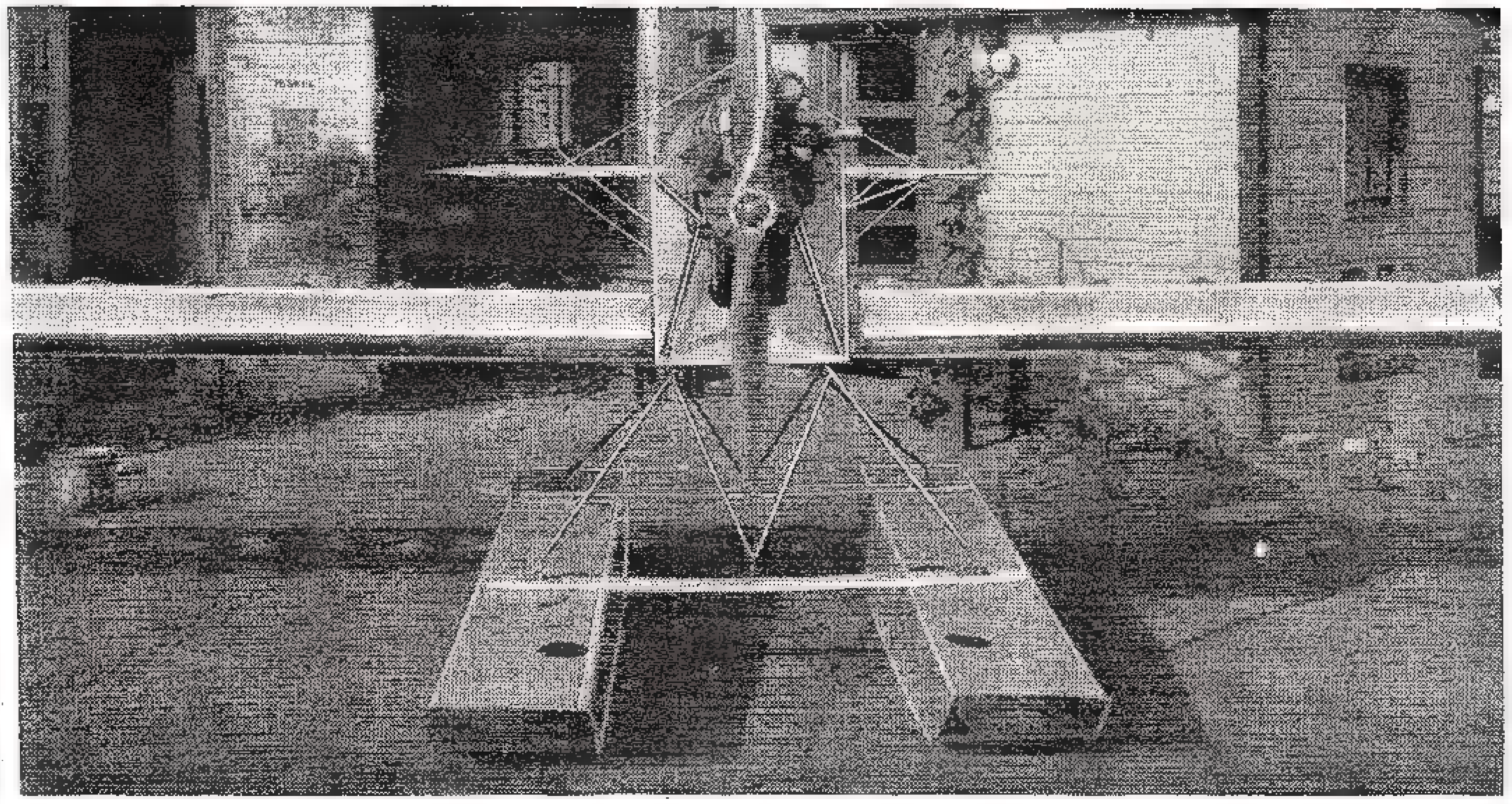


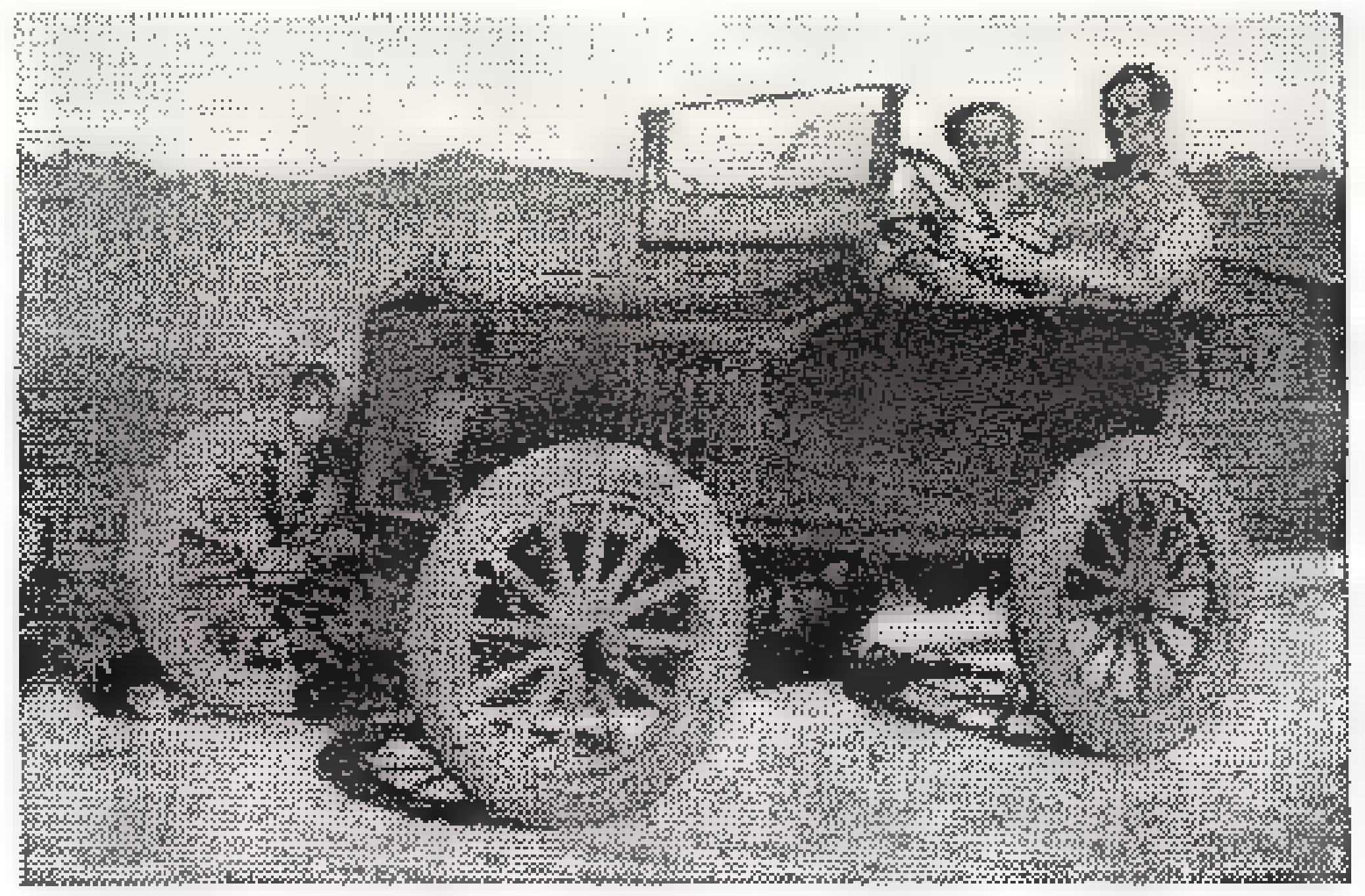
"Just to use up [redacted] old cut," explains Andy, "I'm answering a host of nuts who wrote in wanting another look-see at the seaplane job (non-flying) that ran last month. Here she is before covering. Shot was taken by Sam Wing."

Andy's Shop Mail Box

Andy takes himself a well-earned vacation in California, and prior to shoving off he leaves a load of threats to keep things going smoothly for his pet pig while he's away.

THE time has come, as the Walrus said, to look at many things.

I've been sitting on my haunches in and about the old Robbinsdale hangar now for a couple of years without ary being able to get away, and now what with summer coming, I'm loading up the old DH Moth with an extra quart of oil, sewing [redacted] five dollar bill to the underside of the cockpit cushion to protect me from myself in my wild-sailor spending sprees, and one of these days you guys in California will see me hopping over the hedges to Louse Angles, where theys [redacted] lot of stuff I've been missing and need to get caught up on. I'll be there when you read this. And before I go I'm laying down the law to keep things intact until I get back. More of that later.



This Comedy Ford at last has been claimed by her owner and builder, [redacted] anonymous [redacted] who lives in Soquel, Calif.

* * *

I've always made it a rule not to run an anonymous letter. And the only reason this is anonymous is because I lost the envelope containing the gent's name. But the text is worth digesting:

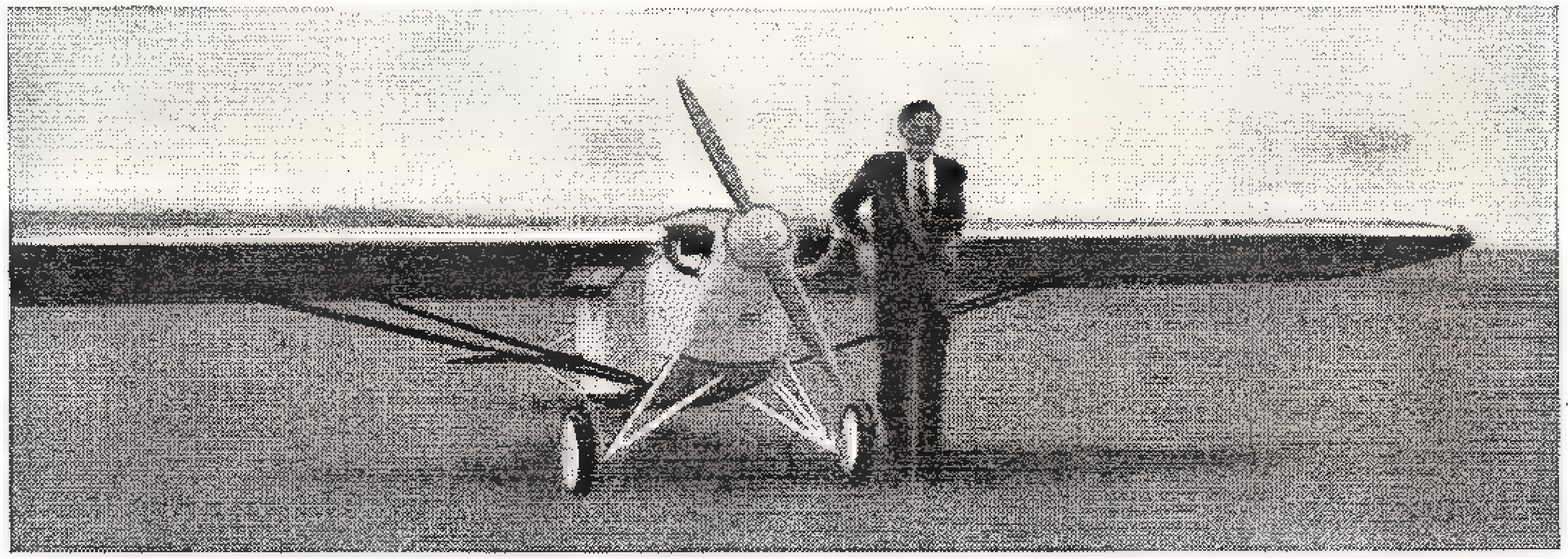
Soquel, California,
P. O. Box 283.

Dear Andy and Gang:

Boy, I've got to hand it to you and Double M for publishing the sweetest mag I ever read. I have enjoyed reading letters in your mail box next to what you have to say for yourself.

I am sending you a picture of the Comedy Ford which I built from details which appeared in the February issue of the good old M.M.

Wow, talk about [redacted] riot, you would think [redacted] circus was in town the way people run out of doors and alleyways, people on the sidewalks all come to a stop to watch old Liz caper around and do her stuff. I nearly got [redacted] ticket for blocking traffic. Everybody stopped to watch old Liz perform her newborn self.



Built by a pal of Leslie Long's, this Church Mid Wing has given a rousing account of herself with that highly successful Long-designed motor, the Harlequin. Les has more to say anent the motor and ship elsewhere in the column.

I have two [redacted] short jack shafts for Fords, [redacted] if any of the gang would like one, [redacted] build up their Comedy Ford, I will sell them [redacted]onable.

Always yours for old M.M. and M. P. mags.
THE CALIFORNIA GREASE NUT.

P.S. Since reading the good old M.M. I can just about make [redacted] repair anything you want except [redacted] broken heart.

* * *

Here's [redacted] chap who has taken a Modern Mechanix and Inventions design and done an intelligent job of following the plans. Witness the views of Mr. Warren La Barre's "Whizzer," designed by Westy Farmer and included in the cargo of "How to Build 20 Boats." Mr. La Barre's letter:

Dear Andy:

This is the first time I have written to you although I get the M.M. every month, and I think it is [redacted] swell mag.

I [redacted] sending you a couple of snapshots of the boat I built from your plans of the "Whizzer" but I changed [redacted] of the things a little. The hull is made of ¼" plywood which I soaked in linseed oil, painted with three coats of paint and two of varnish. It does not leak a drop. It weighs about 175 lbs. with motor and draws about 4 in. of water. The motor is a HD-74 and is mounted on part of the frame. It is braced up with 1" water pipe and ⅛" steel cable crossed, with turnbuckles to steady it.

The prop is made of three pieces of mahogany glued together. It is four feet long and has a four-foot pitch. It will go about 25 to 30 m.p.h., depending [redacted] the wind and current. Everything else is made from the "Whizzer" plans.

Always [redacted] M.M. reader,
Warren La Barre,
903 N. E. Portland Blvd.
Portland, Oregon.

* * *

Later I'm running a letter from Harry Lowe Brownback, a swell gent, by the way, who has something to say about the matter of patents on these hydro-gliders.

* * *

This letter might be prefaced with a thousand comments. I've written all of them and scrapped all of them, so I'm running it as is, wiping a salt tear away from my face for you-know-what:

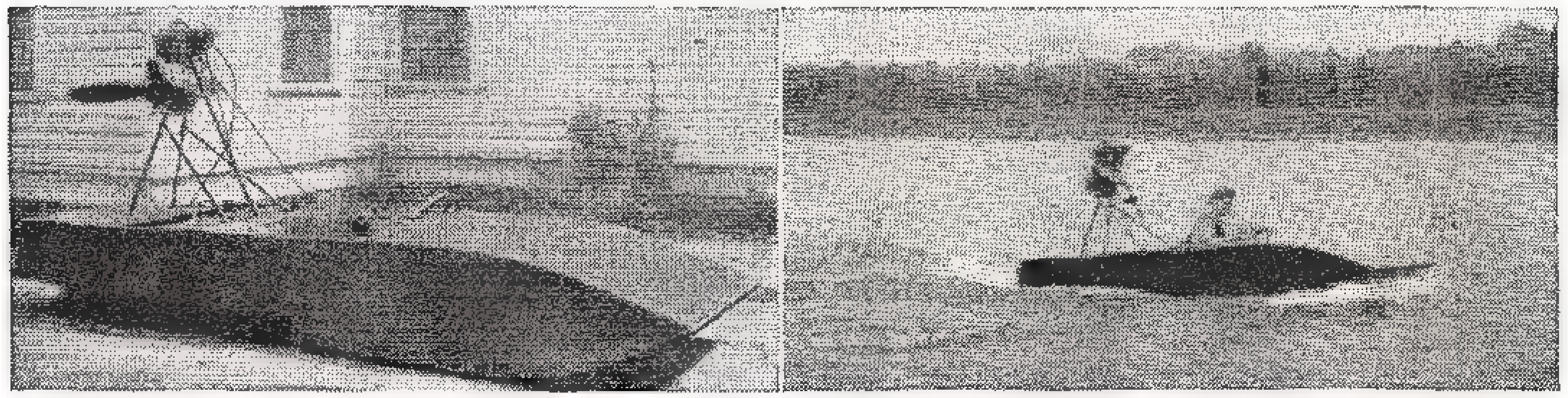
Dear Andy:

Looks [redacted] though you were leaning slightly away from amateur light planes. I would be sorry to [redacted] you leave the game. I wish you could see fit [redacted] run the article and sketches [redacted] changing my Longster over to take the Harlequin motor. You will recall that you had [redacted] make up the drawings and the article was promised for publication in MM [redacted] soon as the Harlequin series was done. I have had [redacted] number of letters asking when it would be out.

Last winter I sent you [redacted] couple of shots of a Church midwing powered with a Harlequin, and these have not showed up either. Wish you could run them in Andy's strip.

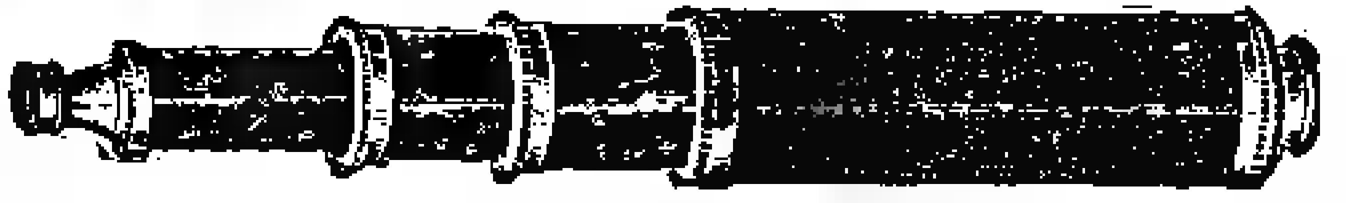
The motor is certainly satisfactory. There

(Continued on page 12)



These views [redacted] of the "Whizzer," built to Farmer's plans, by Warren La Barre, of Portland, Oregon. Mr. La Barre says he gets about 25 miles per hour. Left, the little hydro out of her element, and right "getting out and on it."

Solar Telescope—$1.25



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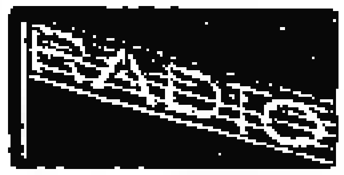

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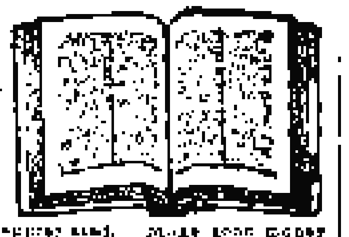

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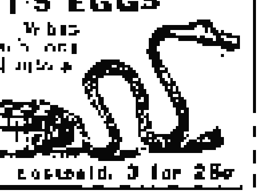

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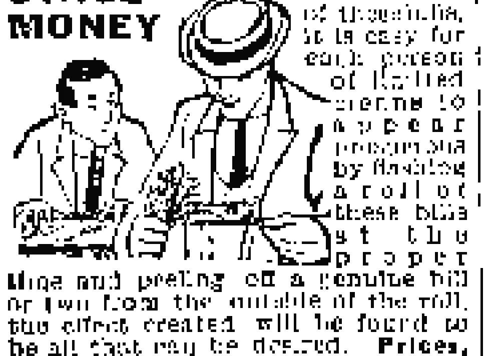

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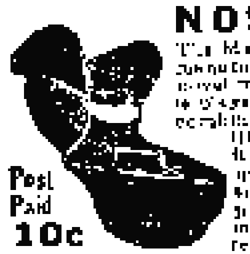

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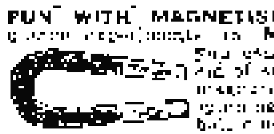


you can perform with the aid of an ordinary magnet, magnetic fish, compass and dipping needle, nail and ball, magnetic ... boat on water, magnetic ... and many other tricks. Also interesting information about lodestones, magnets, electricity, etc. **PRICE 10c ppd.**

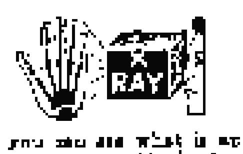
BOOK ON BOATS. How to build rowing, sailing boats. Everything pertaining to boats explained in plain terms so anyone can understand. Illustrated. **10c ppd.**

5-MINUTE HARMONICA COURSE. A new easy self teaching method. Teaches how to play ... harmonica ... Fully illustrated. **Price 15c postpaid.**

MONEY MAKING SECRETS. Golden opportunities for everyone. An over-surprising book of useful money-making ideas, recipes, formulas, wrinkles, trade secrets, etc. Businesses that can be started with little or no capital. ... **10c postpaid.**

TRICKS & SOCIAL ENTERTAINER. Contains hundreds of simple tricks, illusions, or ... that anyone can do. Also explains secrets of second sight. **Price 25c postpaid.**

WONDERFUL X-RAY TUBE



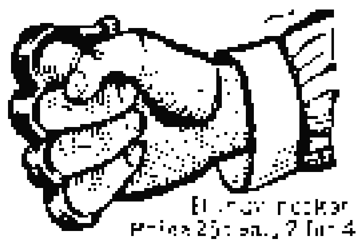
A wonderful little instrument producing optical illusions both surprising and startling. With it you can see what is apparently the bones of your fingers, the lead in a lead pencil, the interior opening in a pipe stem, and many other similar illusions. **Price 10c, 3 for 25c.**

JOHNSON SMITH & CO.

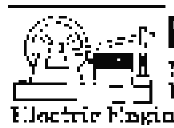
Dept. 919 **RACINE, WIS.**

A copy of our NEW CATALOG mailed on receipt of 10c, or the De Luxe Edition with cloth binding 25c. Bigger and better than ever. Only book of its kind in existence. Nearly 800 pages of all the latest tricks in magic, the newest novelties, puzzles, games, sporting goods, rubber stamps, unusual and interesting books, curiosities in seeds and plants, etc., unprocurable elsewhere. Remit by Coin, Money Order, Check or unused U. S. Postage Stamps, for all articles listed above. Canadian money, stamps and Postal Notes accepted at current rate of exchange.

SILENT DEFENDER



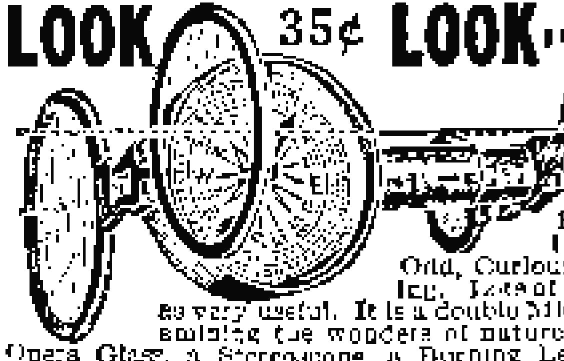
Used by police officers, detectives, sheriffs, night watchmen and others as a means of self-protection. Very effective. Easily fits the hand, the fingers being grasped in the four holes. Very useful in an emergency. Made of aluminum, they are very light, weighing less than 2 ounces. Handy pocket size always ready for instant use. Price 25c ea., 2 for 45c postpaid. *770 page Catalog of Novelties, Sptg. Goods, Firearms, Ammunition, etc., 10c.*



Boy Electrician with 75 illustrations for making Batteries, Dynamos, Motors, Telegraph apparatus, Telephone, Lights, Bells, Alarms, Coils "Wireless" Current Reverser, Electric Engine, Radio, etc. By electrical experts so that anyone can understand it. With big novelty catalog. **All 10c Postpaid.** JOHNSON SMITH & CO., Dept. 919, RACINE, WIS.

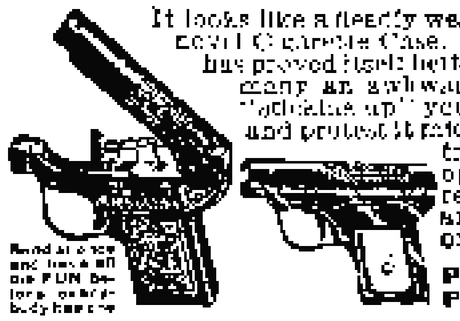
LOOK 35¢ LOOK

Wonderful instrument.



Greatest thing yet. Nine separate articles in one. Everybody delighted with it. Odd, Curious and Interesting. Lots of pleasure as well as very useful. It is a double Microscope for examining the wonders of nature. It is also an Opera Glass, a Stereoscope, a Burning Lens, a Reading Glass, a Telescope, a Compass, a pocket Mirror, and a Laryngoscope—for examining eye, ear, nose and throat. It is worth all the cost to locate even one painful cinder in the eye. Folds flat and fits the pocket. Something great—you need one. Don't miss it. Sent by mail. **Only 35c or 3 for $1.00.**

PISTOL CIGARETTE CASE

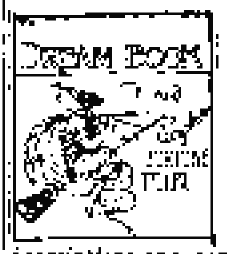


Send at once and have all the FUN before everybody has one

It looks like a deadly weapon, but it is merely a novel Cigarette Case. This clever contrivance has proved itself better than the real thing in many an awkward encounter. Great fun "sticking up" your friends. They squirm and protest it might be loaded. Pull the trigger and the slide flies open disclosing the cigarettes. Well made, light and compact. Weight only 2 ounces.

PRICE POSTPAID 35c

Tell Your Own Fortune



With the aid of this dream book and fortune teller. The key to your future. Will you be lucky in love? Successful in business? Will you be wealthy? Complete dictionary of dreams with descriptions and correct interpretations, with lucky numbers, fortunate days, moles, divination, palmistry, etc. Also tells how to tell fortunes by various methods, by grounds of coffee or tea, by dominoes, by cards, ... with dice, lucky days, signs, ... how to receive ... by dreams, flower and charm ... **PRICE 10c**

LEARN to Hypnotize

This remarkable book tells how. Explains all about Hypnotism, how to hypnotize, how to produce sleep, how to awaken a subject, how to hypnotize animals, hypnotism in diseases, hypnotism for scientific purposes, illusions and hallucinations, personal magnetism, thought transference, etc. Written in plain, everyday language that anybody can understand. **PRICE 10c postpaid.**

FORTUNE TELLING [redacted] CARDS

64-page book tells how. Gives the meaning of each and every card, how to deal and lay them out. Everything explained in simple language. **PRICE 10c postpaid.** *770 page catalog 10c.*

Address orders for all goods on above and on following page to Johnson Smith & Co., Dept. 919, Racine, Wis.

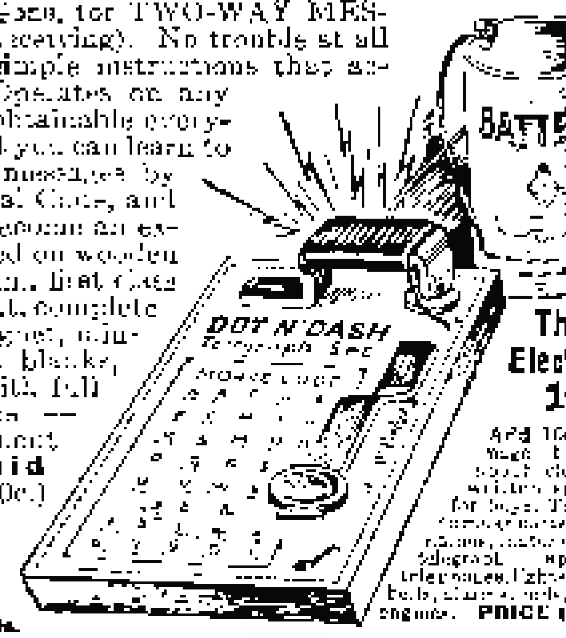
Electric Telegraph Set

15c

BOYS! A private Electric Telegraph Set of your own for **15c**. Lots of fun sending messages to your friends. Better still get two sets, hook them up as shown in the directions, for TWO-WAY MESSAGES (sending and receiving). No trouble at all to operate with the simple instructions that accompany each set. Operates on any standard dry battery obtainable everywhere. With this outfit you can learn to transmit and receive messages by the Morse International Code, and in a very short time become an expert operator. Mounted on wooden base measuring 4 x 3 in. Best class construction throughout, complete with key, sounder, magnet, miniature Western Union blanks, packed in neat box with full illustrated instructions — **ALL FOR 15c** (without battery) **postpaid** (Canada and Foreign 20c.)

770 page catalog of novelties, jokes, tricks, puzzles, books, etc. 10c.

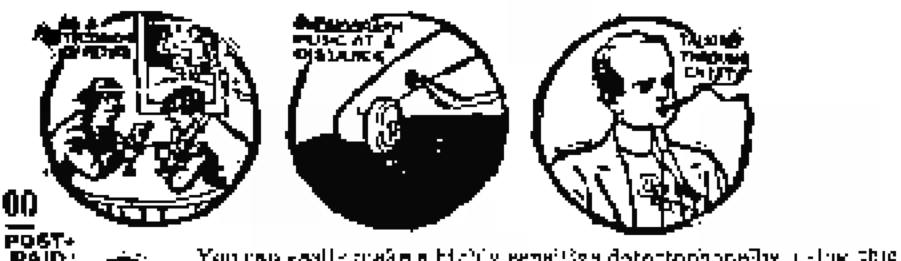
JOHNSON SMITH & CO.
Dept. 919, Racine, Wis.



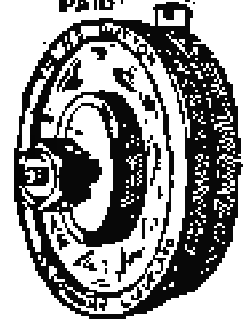
The Boy Electrician 10c

And 10c for 64 page book of ... electrical ... for boys. Tells how to make batteries, dynamos, motors, radios, telegraph apparatus, telephones, lights, electric bells, alarms, coils, electric engines. **PRICE 10c ppd.**

MICROPHONE TRANSMITTER BUTTON



$1.00 POST-PAID

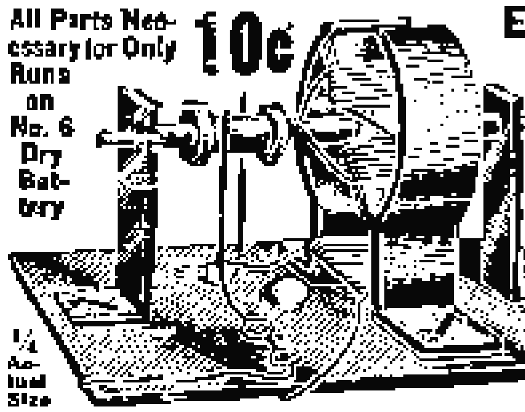


You can easily make a highly sensitive detectophone by using this Transmitter Button to collect the sound waves. You can build your own outfit without buying expensive equipment. It is simple and inexpensive. You can install an outfit in your home and hear conversations being held all over the house. You can connect up different rooms of a hotel. This outfit was used by secret service operatives during the war. It is being used on the stage. It is ultra-sensitive and is the greatest invention in microphones. You can mount the button almost anywhere—headboard, boxes, ... under tables, on the wall, behind a picture frame, etc. Button is so light and small it cannot be detected. Persons can be overheard without suspecting it. You can listen in on conversations in another room. A deaf person in the audience can hear the speaker. Connected to phonograph, piano or other musical instrument, music can be heard hundreds of feet away. Button may be used to make microphone transmitters, check mikes, old line "talkie-outs", wired for nothing else ... The ideal microphone for radio ... Most outfits extremely sensitive. Amplifies radio signals. Countless other similar uses will suggest themselves. Experimenters find the Button useful for hundreds of experiments along the lines of telephones, amplifiers, loud speakers, etc. Many fascinating stunts may be devised, such as holding the Button against the throat or chest to reproduce speech without sound waves. $5.00 is given to anyone who sends in a new suggestion for the use of the Button providing the manufacturers find it suitable for use in their literature. **PRICE $1.00 POSTPAID.**

ELECTRIC MOTOR

All Parts Necessary for Only 10c

Runs on No. 6 Dry Battery



¼ Actual Size

An Electric Motor for Only 10 cents. Sounds almost unbelievable but it is perfectly true. For ONLY 10 cents we send you all the parts necessary packed in a neat box with full printed and illustrated directions for assembling. No trouble at all putting the parts together, in fact it is FUN. Just follow a few simple instructions and in a few minutes the motor is ready to run. **10c postpaid.**

BIG ENTERTAINER

180 Jokes and Riddles, 34 Magic Tricks, 54 Parlor Games, 73 Toasts, 15 Card Tricks, 9 Fairy Tales, 50 Money-making Secrets, 10 Funny Readings, 3 Monologues, 21 Puzzles and Problems, 5 Comic Recitations, Cut-outs for Checkers and Chess, Dominoes, Fox and Geese, 9 Men Morris, Spanish Prison Puzzle, Game of Anagrams, etc. **All for 15c postpaid.** *770 page Catalog of novelties, jokes, tricks, etc., 10c.*

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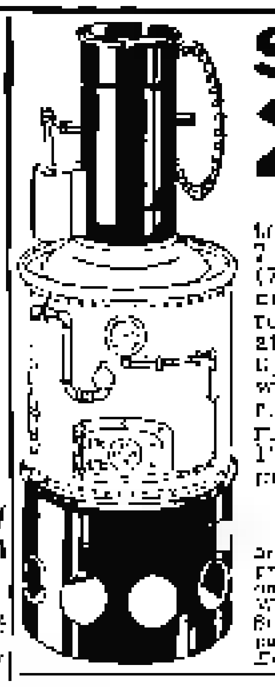
STEAM ENGINE



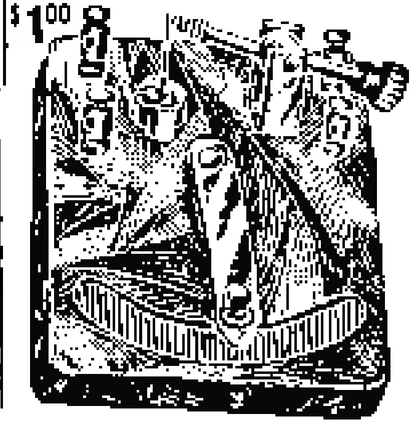
25c **NEW POWERFUL MODEL JUST OUT** **Add 10c for postage and packing**

The world's biggest value in mechanical toys. A great big steam engine, measuring 7 inches in height by 2¼ inches in diameter (7½ inches in circumference) for **ONLY 25 cents.** You should see it run, too. It's a revelation to see the fly wheel spin around at a great rate as soon as you "get steam up." Just light up, fill the boiler with water, and in a few minutes the engine is running at top speed. New model just out, runs on alcohol or canned heat—MORE POWER. Has fly wheel for running small mechanical toys.

GUARANTEED TO RUN

It is foolproof, seamless, fully tested and guaranteed to run. A scientific toy that illustrates the principle of the steam engine. Runs for hours on one filling of water. Every boy should have one. Wonderfully well made. ... Sells for **ONLY 25c**, with 10c extra for postage and packing. ... *Electric Model ... Price 98c, postage 10c extra.*

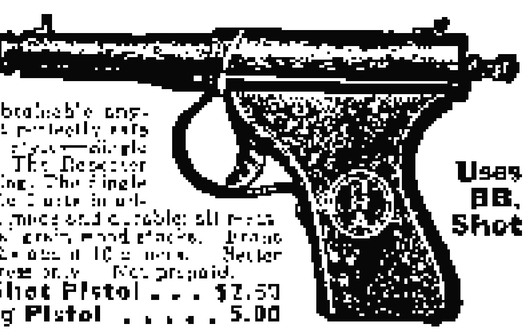
Crystal Radio Receiver, $1.00



$1.00

Say what you will about Electrical and Battery Sets, a CRYSTAL set has them all beat for simplicity and clearness of tone. There is absolutely no noise and no distortion — no batteries to buy — no tubes to wear out — no maintenance expense whatsoever. Cost nothing to operate and will last indefinitely. Reception is loud and clear. This Receiver is guaranteed to work equal to the best expensive Crystal set you can buy. Has a receiving radius of over 25 miles, or under favorable conditions up to 100 miles. Constructed of the finest materials throughout, including guaranteed ... crystal, assuring quick results. PRICE of Receiver only **$1.00 postpaid.** Or complete with Ear Phone and Aerial Kit—everything all complete—nothing more to buy, **$2.95 postpaid. JOHNSON SMITH & CO., Dept. 919, RACINE, WIS.**

Single and 100-Shot AIR PISTOLS



Uses BB. Shot

Just what you've always wanted. A powerful, high grade Air Pistol, shaped like an Automatic pocket pistol. Fires B. B. shot obtainable anywhere. Very powerful yet perfectly safe for boys to handle. Two styles—single Shot Pistol or Repeater. The Repeater fires 100 shots in one loading. The single Shot Pistol shoots ... according to B. B. Shot. Well made and durable; all metal parts ... plated; natural grain wood stocks. Front and rear sights. Weight about 10 ounces. Better than an air rifle. By Express only. Not prepaid.

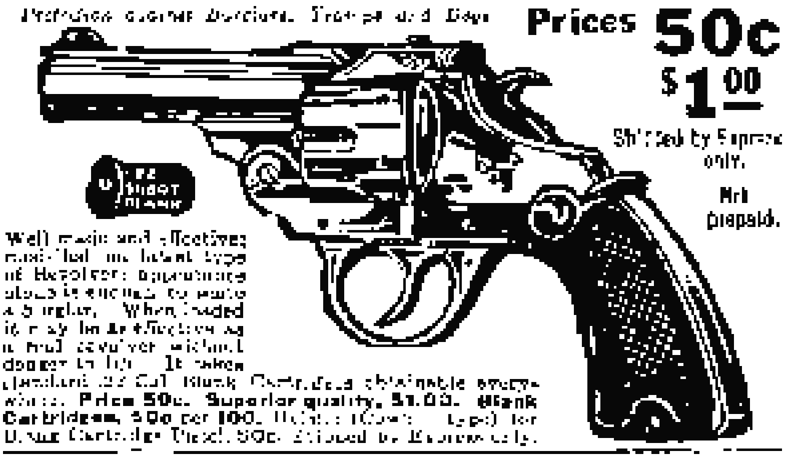
PRICES: Single Shot Pistol . . . $2.50
100-Shot Repeating Pistol 5.00

BLANK CARTRIDGE PISTOL

Protection against Burglars, Tramps and Dogs

Prices 50c $1.00

Shipped by Express only. Not prepaid.

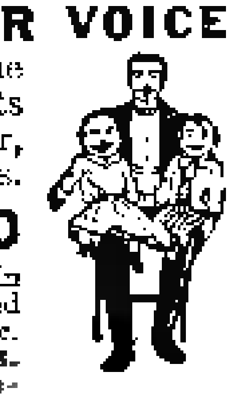


Well made and effective; modelled on latest type of Revolver; appearance alone is enough to scare a burglar. When loaded it may be as effective as a real revolver without danger to life. It takes standard .22 Cal. Blank Cartridges obtainable everywhere. **Price 50c. Superior quality, $1.00. Blank Cartridges, 50c per 100.** Holster (Cowboy type) for Blank Cartridge Pistol, 50c. Shipped by Express only.

BOYS! THROW YOUR VOICE

Into a trunk, under the bed or anywhere. Lots of fun fooling teacher, policeman or friends.

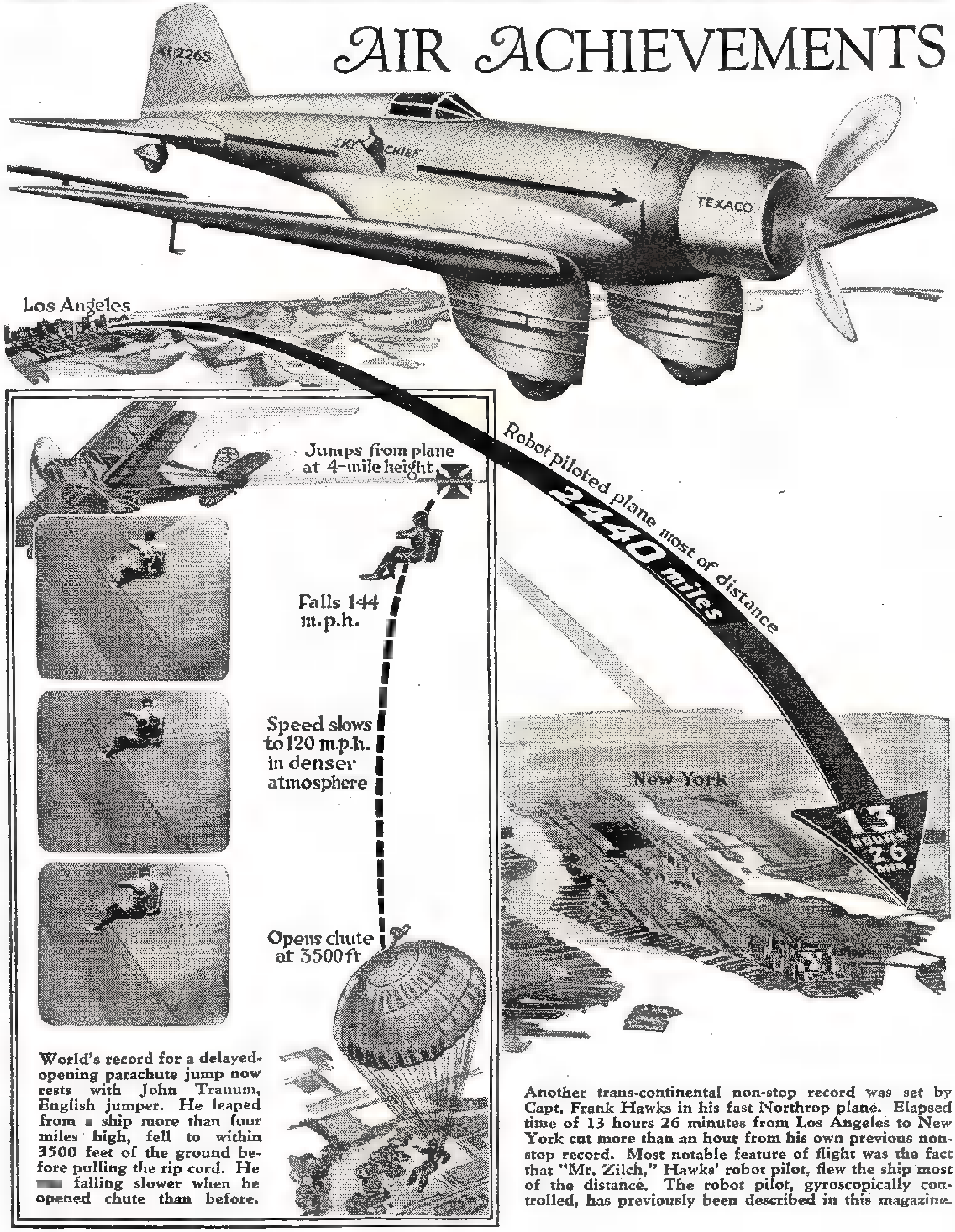
THE VENTRILO



a little instrument, fits in the mouth out of sight, used with above for Bird Calls, etc. Anyone can use it. **Never fails. A 16 page course on Ventriloquism and the Ventrilo. All for 10 [redacted] postpaid. JOHNSON SMITH & CO., Dept. 919, RACINE, WIS.**

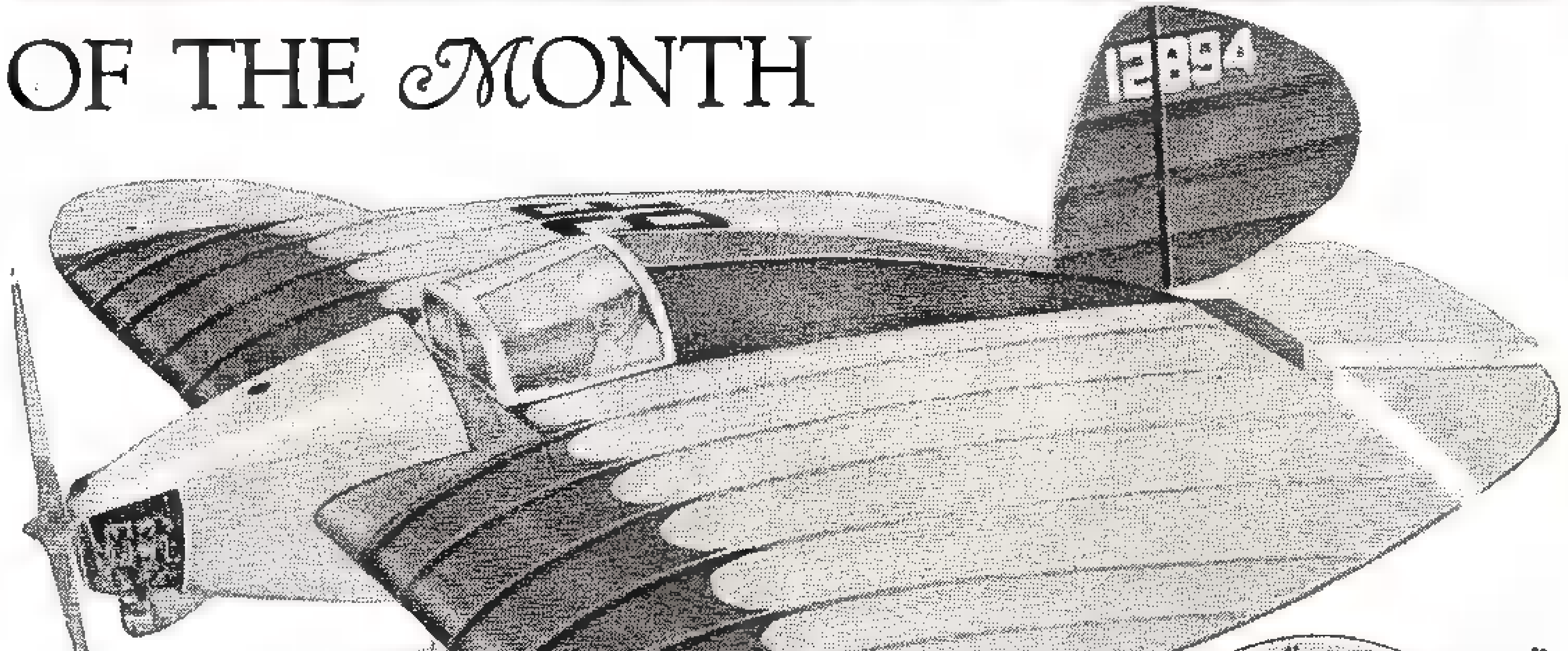
MODERN MECHANIX AND INVENTIONS
EDITORIAL OFFICES, 529 SOUTH SEVENTH STREET MINNEAPOLIS, MINNESOTA — PRICE 15 CENTS

AIR ACHIEVEMENTS OF THE MONTH

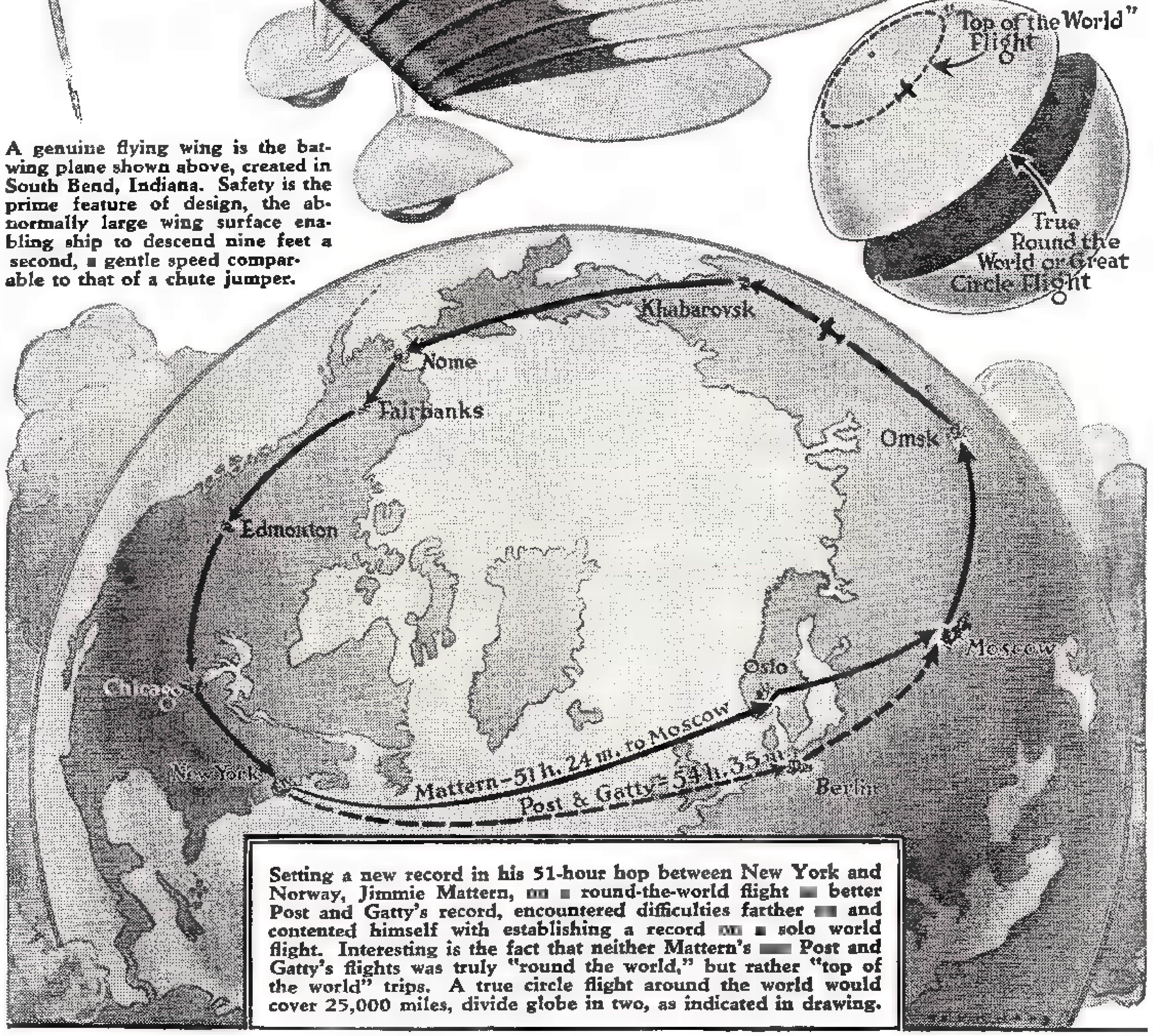

NR12265
SKY CHIEF
TEXACO
Los Angeles
Robot piloted plane most of distance
2440 miles
New York
13 HOURS 26 MIN.
Jumps from plane at 4-mile height
Falls 144 m.p.h.
Speed slows to 120 m.p.h. in denser atmosphere
Opens chute at 3500ft

World's record for a delayed-opening parachute jump now rests with John Tranum, English jumper. He leaped from [redacted] ship more than four miles high, fell to within 3500 feet of the ground before pulling the rip cord. He [redacted] falling slower when he opened chute than before.

Another trans-continental non-stop record was set by Capt. Frank Hawks in his fast Northrop plane. Elapsed time of 13 hours 26 minutes from Los Angeles to New York cut more than an hour from his own previous non-stop record. Most notable feature of flight was the fact that "Mr. Zilch," Hawks' robot pilot, flew the ship most of the distance. The robot pilot, gyroscopically controlled, has previously been described in this magazine.

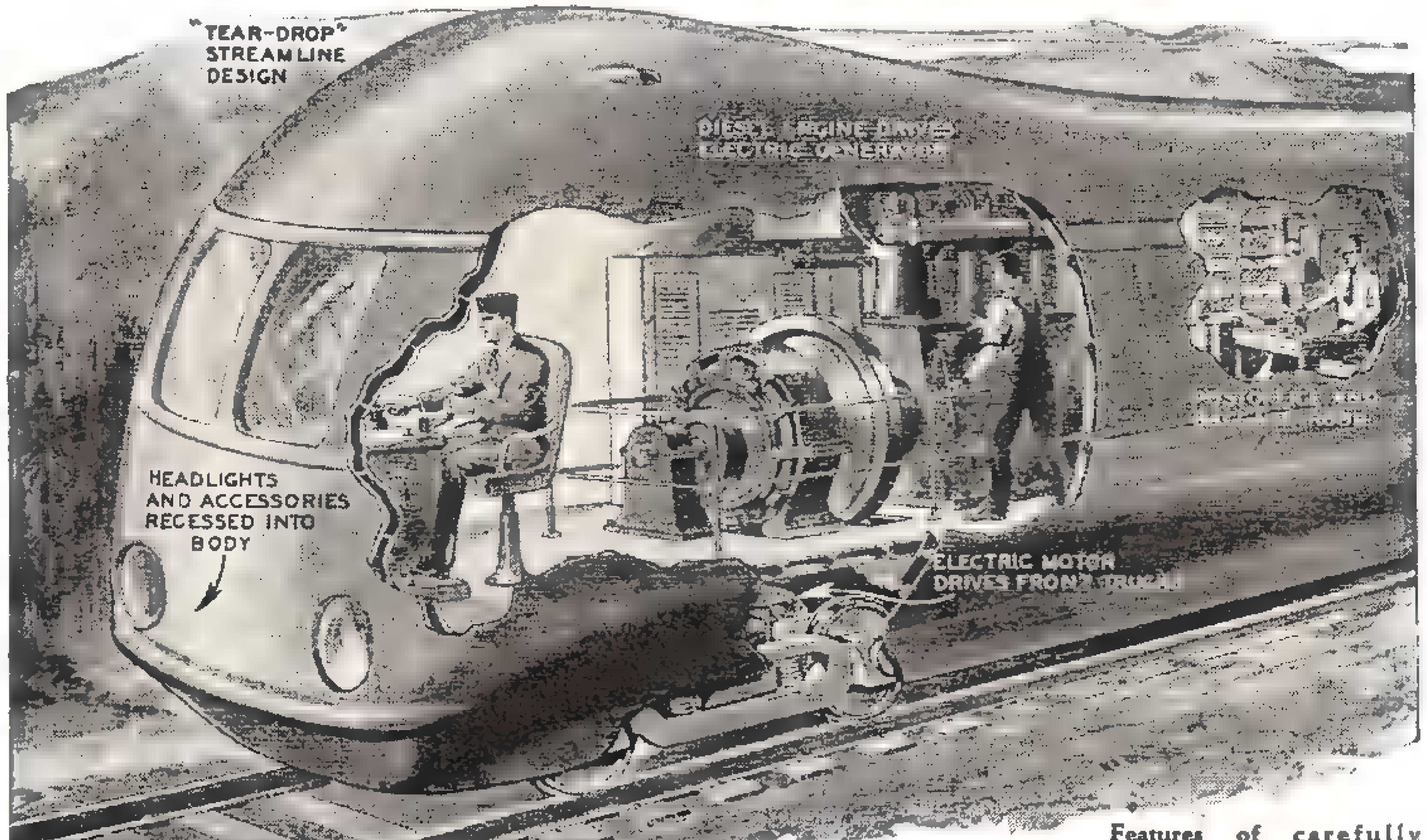


A genuine flying wing is the bat-wing plane shown above, created in South Bend, Indiana. Safety is the prime feature of design, the abnormally large wing surface enabling ship to descend nine feet a second, [redacted] gentle speed comparable to that of a chute jumper.

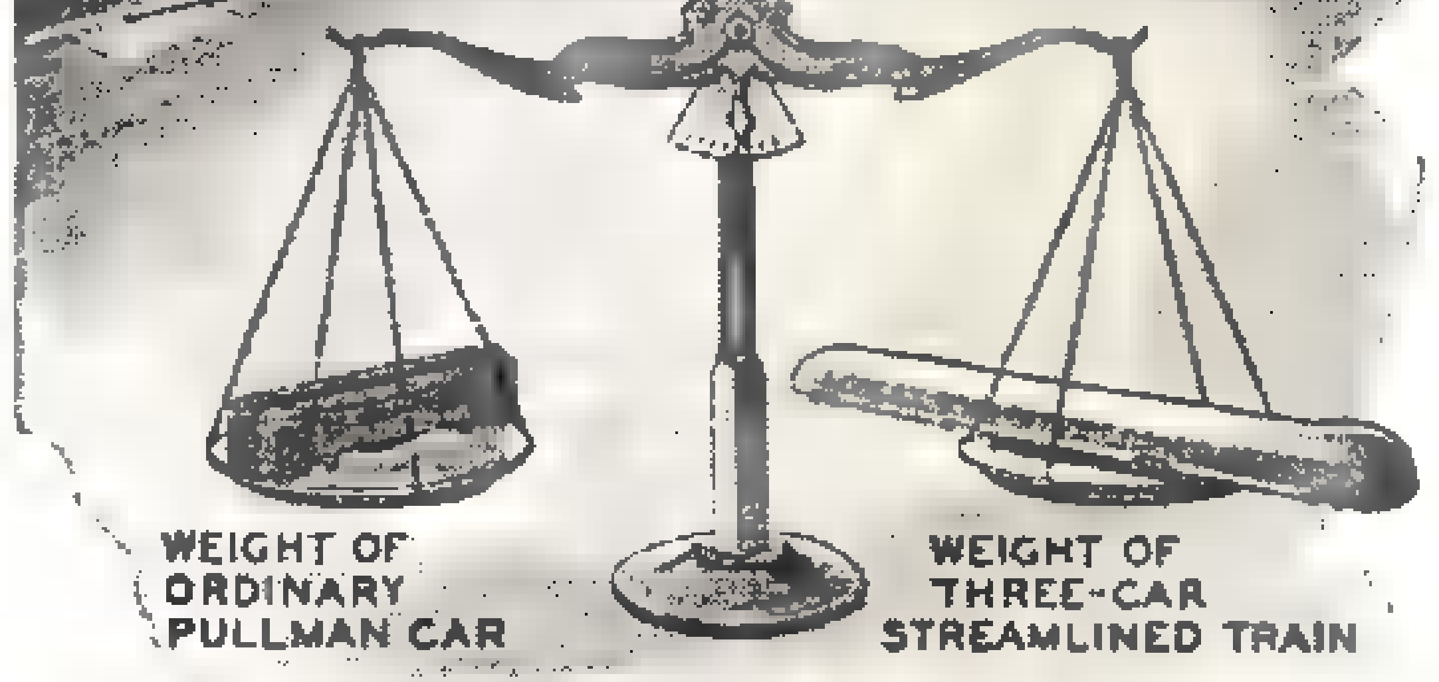

"Top of the World" Flight
True Round the World or Great Circle Flight
Khabarovsk
Nome
Fairbanks
Omsk
Edmonton
Chicago
Oslo
Moscow
New York
Berlin
Mattern–51 h. 24 m. to Moscow
Post & Gatty–54 h. 35 m.

Setting a new record in his 51-hour hop between New York and Norway, Jimmie Mattern, [redacted] round-the-world flight [redacted] better Post and Gatty's record, encountered difficulties farther [redacted] and contented himself with establishing a record [redacted] solo world flight. Interesting is the fact that neither Mattern's [redacted] Post and Gatty's flights was truly "round the world," but rather "top of the world" trips. A true circle flight around the world would cover 25,000 miles, divide globe in two, as indicated in drawing.

Streamline TRAIN Heralds New Era for RAILROADS


"TEAR-DROP" STREAMLINE DESIGN
DIESEL ENGINE DRIVES ELECTRIC GENERATOR
HEADLIGHTS AND ACCESSORIES RECESSED INTO BODY
ELECTRIC MOTOR DRIVES FRONT TRUCK

Features of carefully streamlined train under construction for Union Pacific Railway are given in drawing. Note clean, cinderless power mechanism—Diesel engine hooked to generator and motor on front trucks. At left, three-car streamlined train weighs no more than ordinary Pullman.


WEIGHT OF ORDINARY PULLMAN CAR
WEIGHT OF THREE-CAR STREAMLINED TRAIN

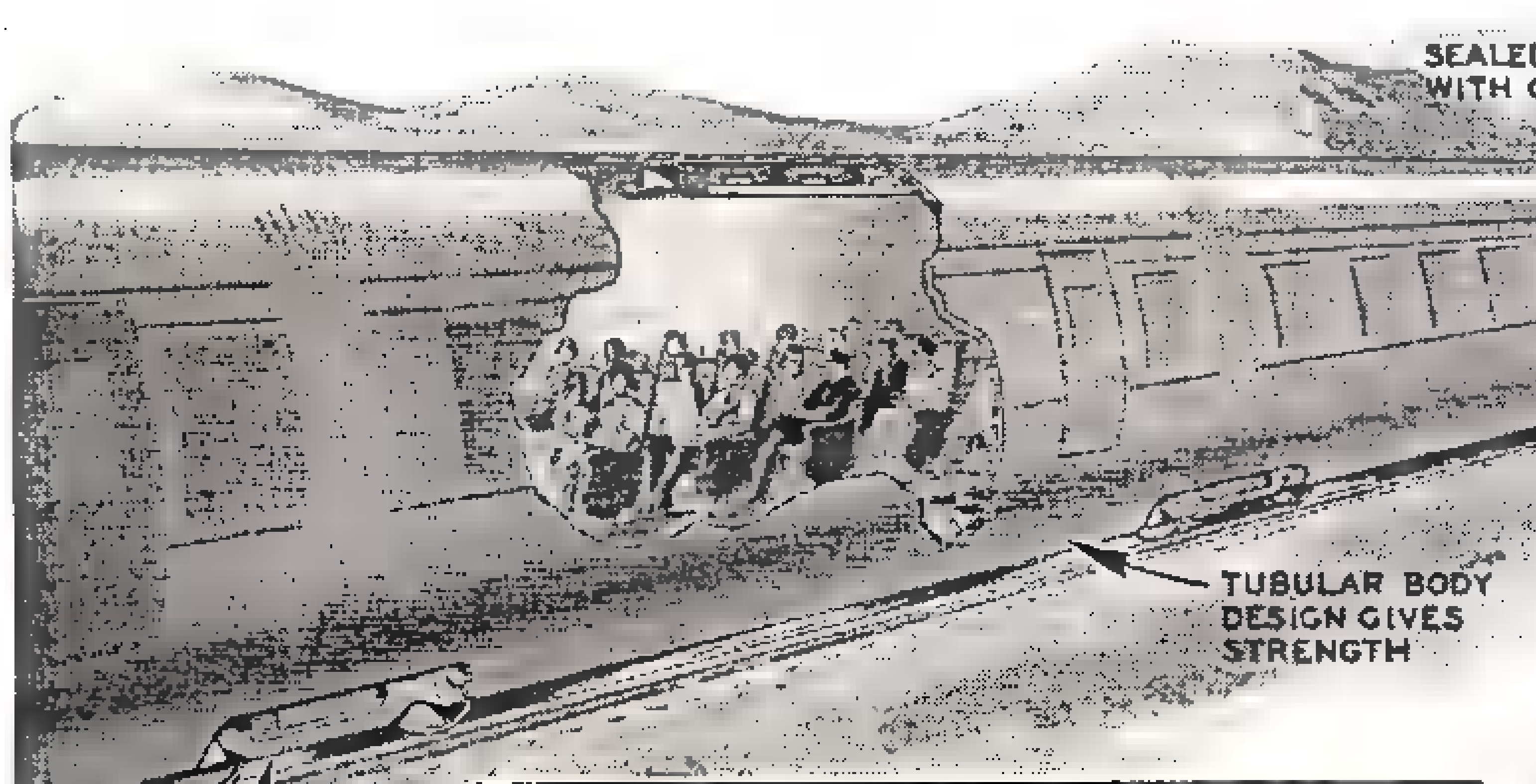
by ROY DEAN

Super-speed railway trains are here—rivaling airplanes in swiftness, gliding along in luxurious silence, resembling trains no more than the Leviathan looks like the flagship of Columbus. An amazing new era in railroad transportation is forcing present-style trains toward the junkpile. The "why" of this astonishing revolution in travel style is given in this absorbing article.

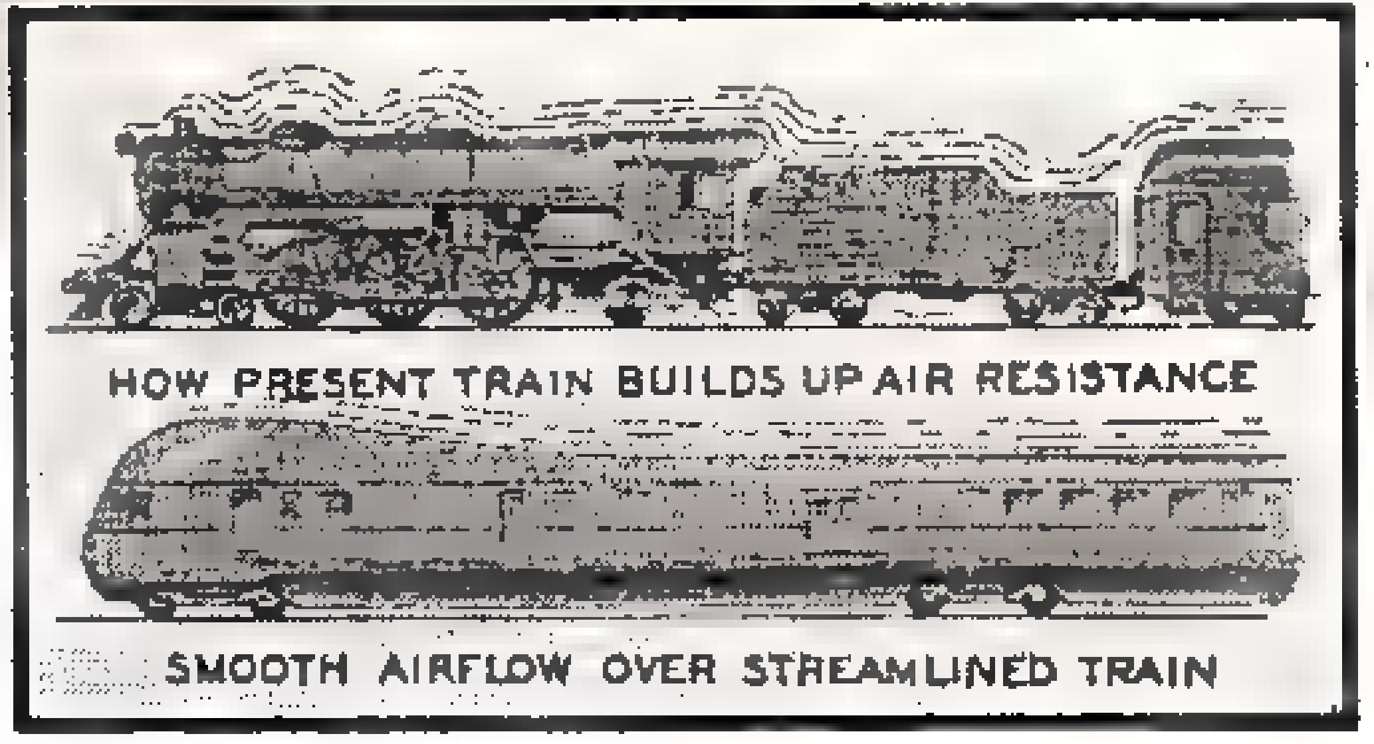
Interior of new aluminum Pullman car, weighing but half as much as conventional steel car. Note air ducts in ceiling.

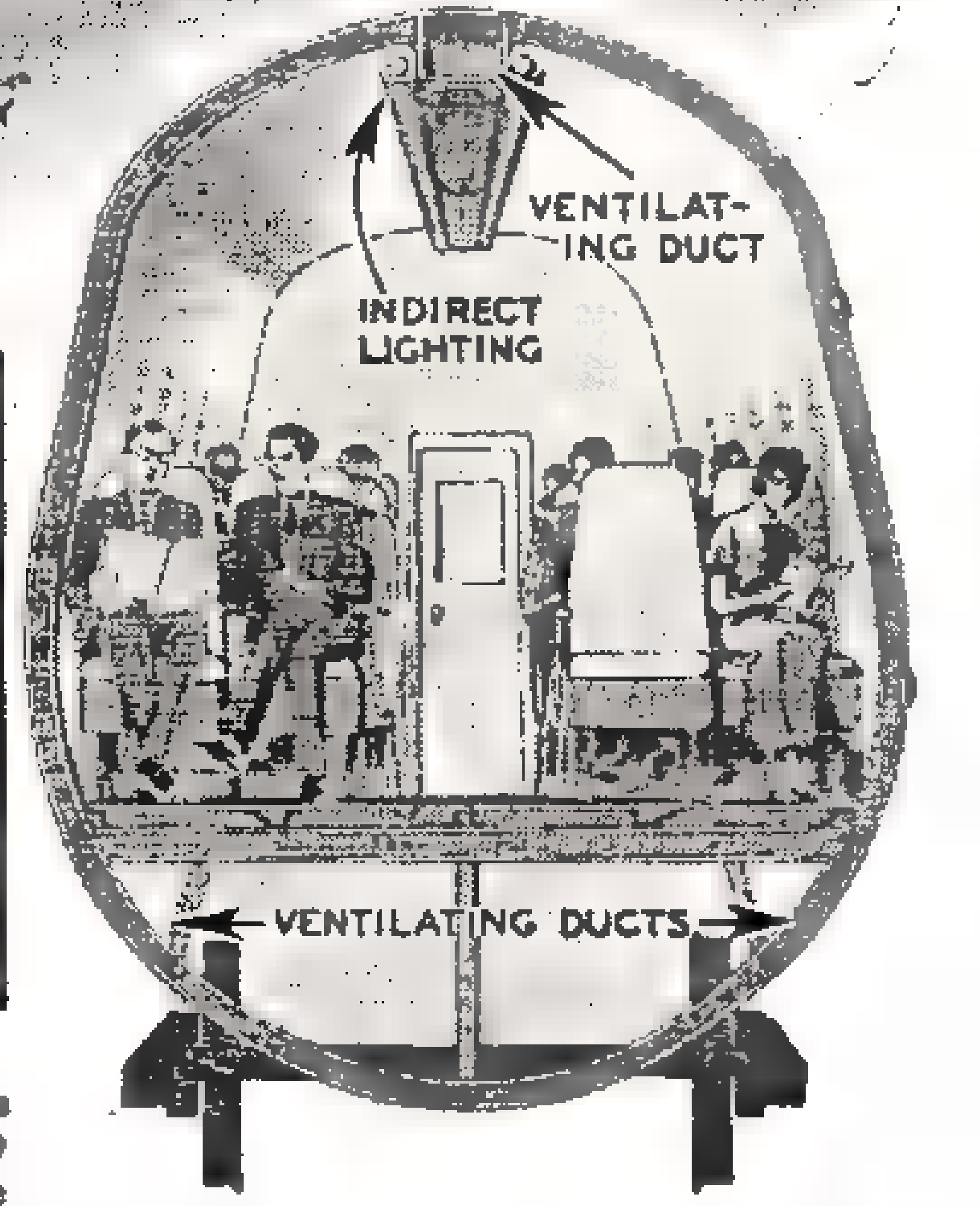
A FEW months ago MODERN MECHANIX AND INVENTIONS published an article calling attention to the need for an entirely new type of railroad train which would give passengers cool, clean, quiet transportation free from the annoyances of cinders, blasts of desert air from outside, the jerking and swaying of cars in motion, and the endless click of wheels against rail joints.

Now such a train is in actual process of construction for the Union Pacific Railway, and transportation experts are unanimous in the opinion that its design opens up a new era in rail travel which will eventually force the heavy steel trains of today, with their fuming coal-burning locomotives, onto the scrap heap. A real revolution in train design is well under way—belatedly enough, when one considers that except for size our present locomotives are not essentially different from those used a hundred years ago, and there have been few new principles in passenger car structure since someone thought of putting a roof over a floor on wheels.


SEALED WINDOWS FLUSH WITH CAR SURFACE
TUBULAR BODY DESIGN GIVES STRENGTH
RUBBER IN TRUCKS - RESILIENT WHEELS

Cars of streamline train are articulated—one truck between two cars and the cars hinged together. By eliminating slack motion, this improves riding quality. At right, how speed is gained by streamlining.


HOW PRESENT TRAIN BUILDS UP AIR RESISTANCE
SMOOTH AIRFLOW OVER STREAMLINED TRAIN


VENTILATING DUCT
INDIRECT LIGHTING
VENTILATING DUCTS

Right above, cross section of new train. Note the three ducts for forced ventilation of washed air. All cars are completely sealed against outside air. Note the tubular construction of body which gives great strength.

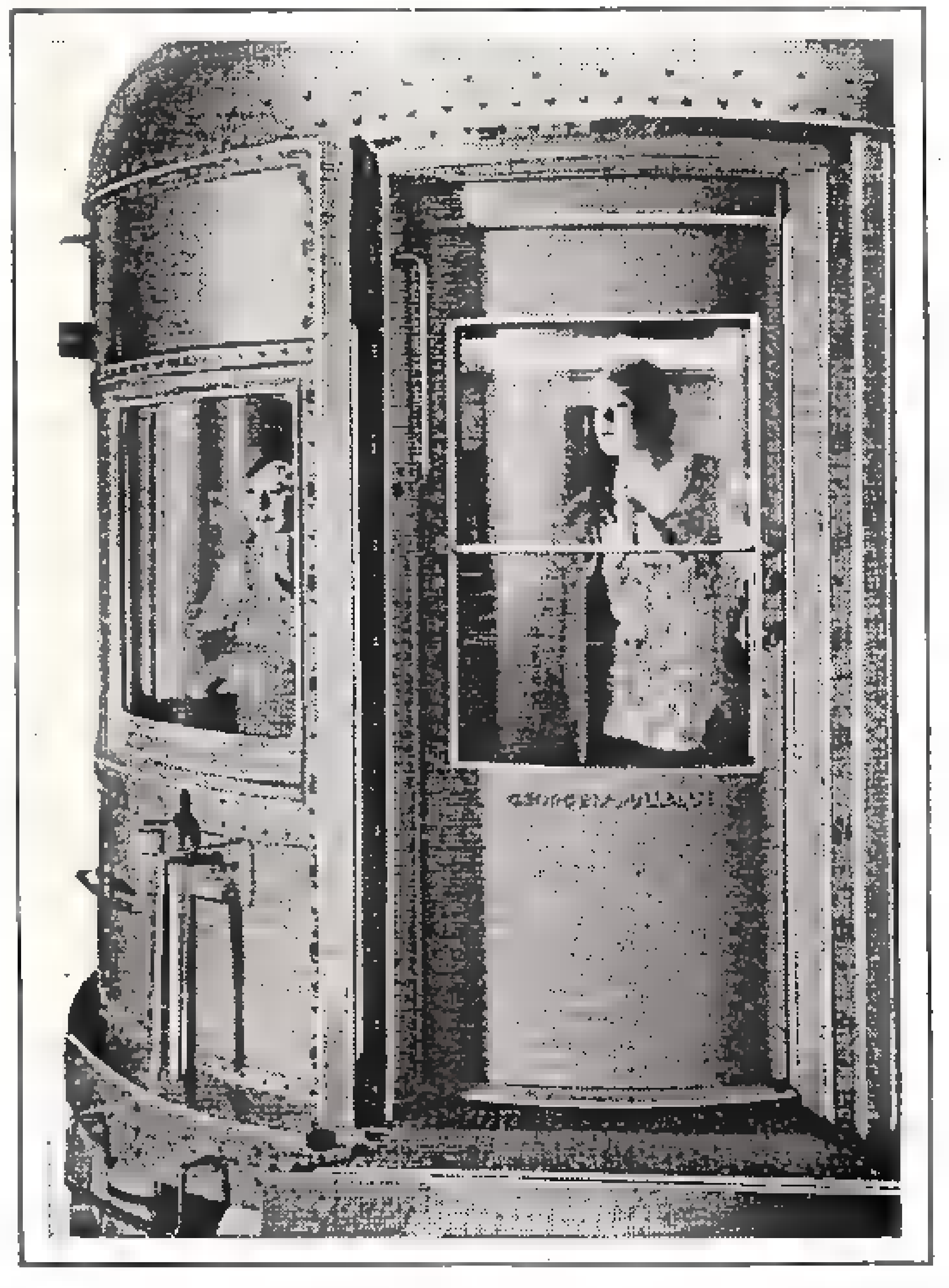
Competition of automobile, bus, truck and airplane has finally forced the railroads out of their inertia, made them realize that plenty of passenger business is theirs to command if they furnish the public what it demands in the way of economy and comfort.

Power Needs Reduced by Half

That the Union Pacific train fills this bill to a T, there can be no doubt after a study of the design reproduced above. It is fully streamlined, and this, in conjunction with its light weight (the three-car train weighs no more than an ordinary Pullman) makes possible speeds of 110 miles an hour.

To the airplane is due the development of aluminum alloys which reduce weight two-thirds. Each car of the new train is tubular in shape, giving great strength. Streamlining of the train is carried farther than ever before, so efficiently that it is estimated power requirements at 100 miles an hour will be only half that required for conventional trains.

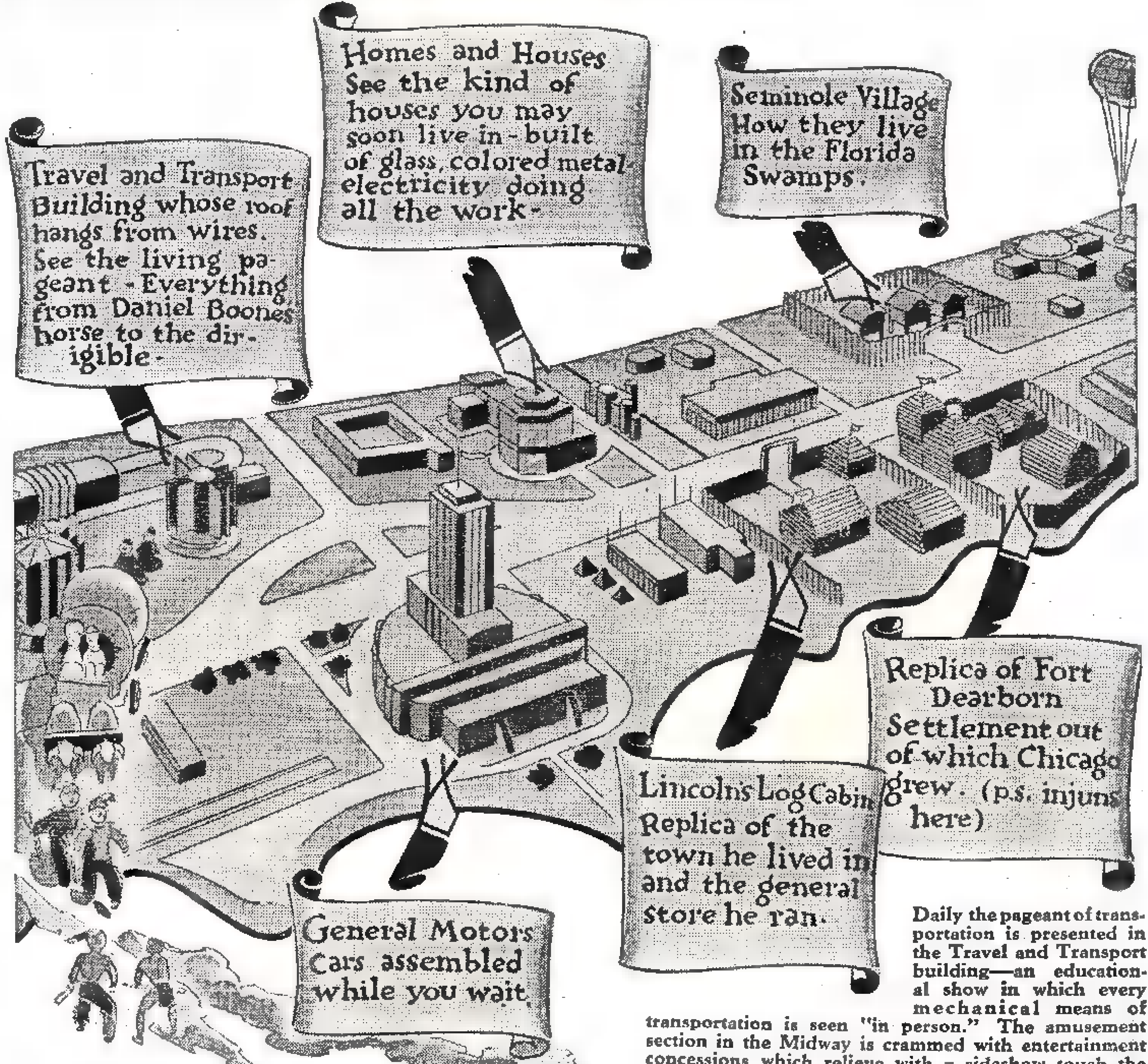
Windows are placed flush with the walls, vestibules between cars completely covered over, and headlights and other projecting units are recessed into the body. Outside air never enters the train. Three ducts keep



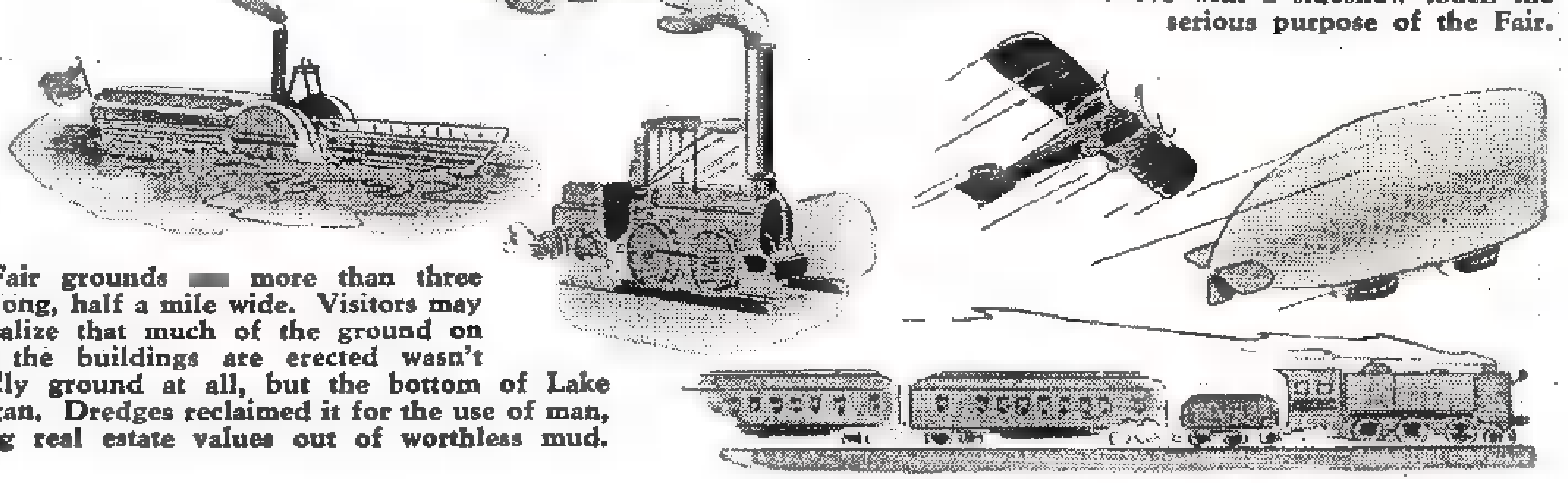
Rounded end of new Pullman car, interior of which is shown on opposite page. Steel, too heavy, is out of the picture in new railcars; light metal alloys take its place.

THINGS You Mustn't Miss at Chicago's WORLD Fair

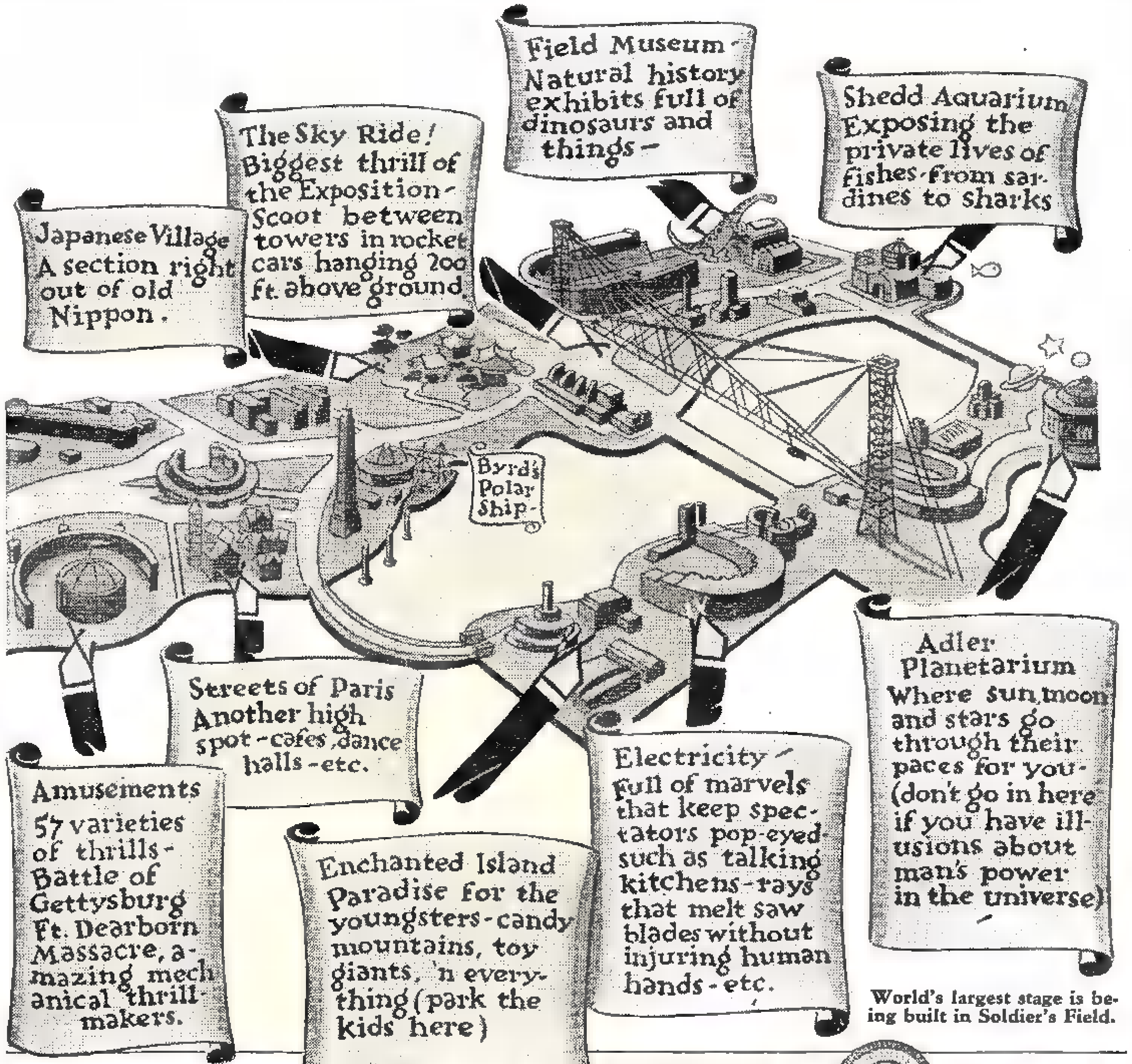
CHICAGO'S Century of Progress Exposition—more familiarly known as the World Fair—has been open long enough for visitors to realize that if they are to "do" the show completely, passing up none of its features, they will have to devote all their waking hours for the next six months to the purpose. So crammed is the exposition with marvelous exhibits from all over the world that some sort of guide to the high spots will be welcomed—hence the picture map reproduced on these pages. It doesn't pretend to exhaust the possibilities of the Fair; it would take a volume about the size of an unabridged dictionary to do that. But it does point out features which early Fair visitors have found to be the most interesting of them all. If you have only a day or two at the show, take the map along for your guidance.


Travel and Transport Building whose roof hangs from wires. See the living pageant - Everything from Daniel Boone's horse to the dirigible -
Homes and Houses See the kind of houses you may soon live in - built of glass, colored metal - electricity doing all the work -
Seminole Village How they live in the Florida Swamps.
Replica of Fort Dearborn Settlement out of which Chicago grew. (p.s. injuns here)
Lincoln's Log Cabin Replica of the town he lived in and the general store he ran.
General Motors Cars assembled while you wait.

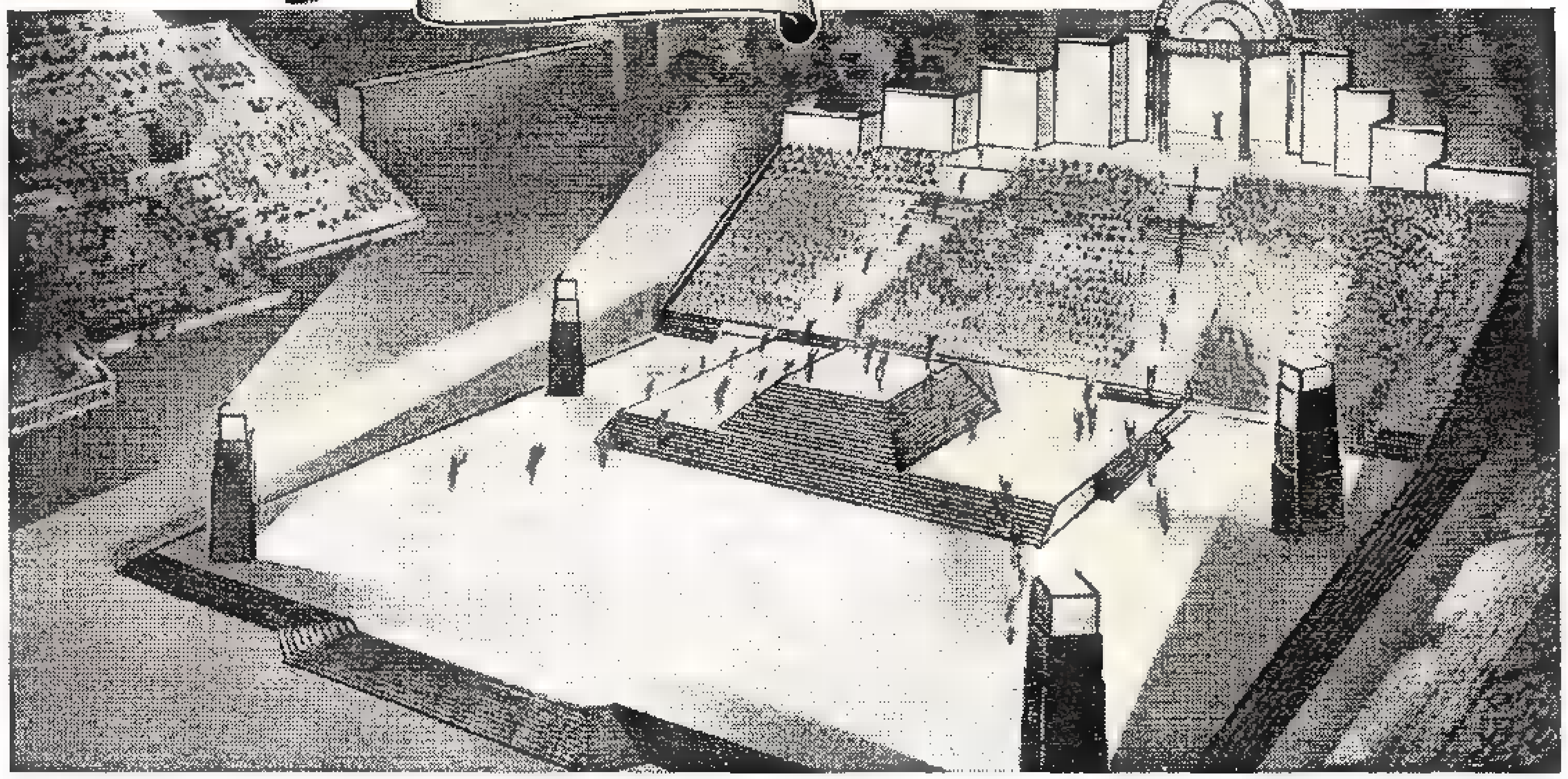
Daily the pageant of transportation is presented in the Travel and Transport building—an educational show in which every mechanical means of transportation is seen "in person." The amusement section in the Midway is crammed with entertainment concessions which relieve with a sideshow touch the serious purpose of the Fair.



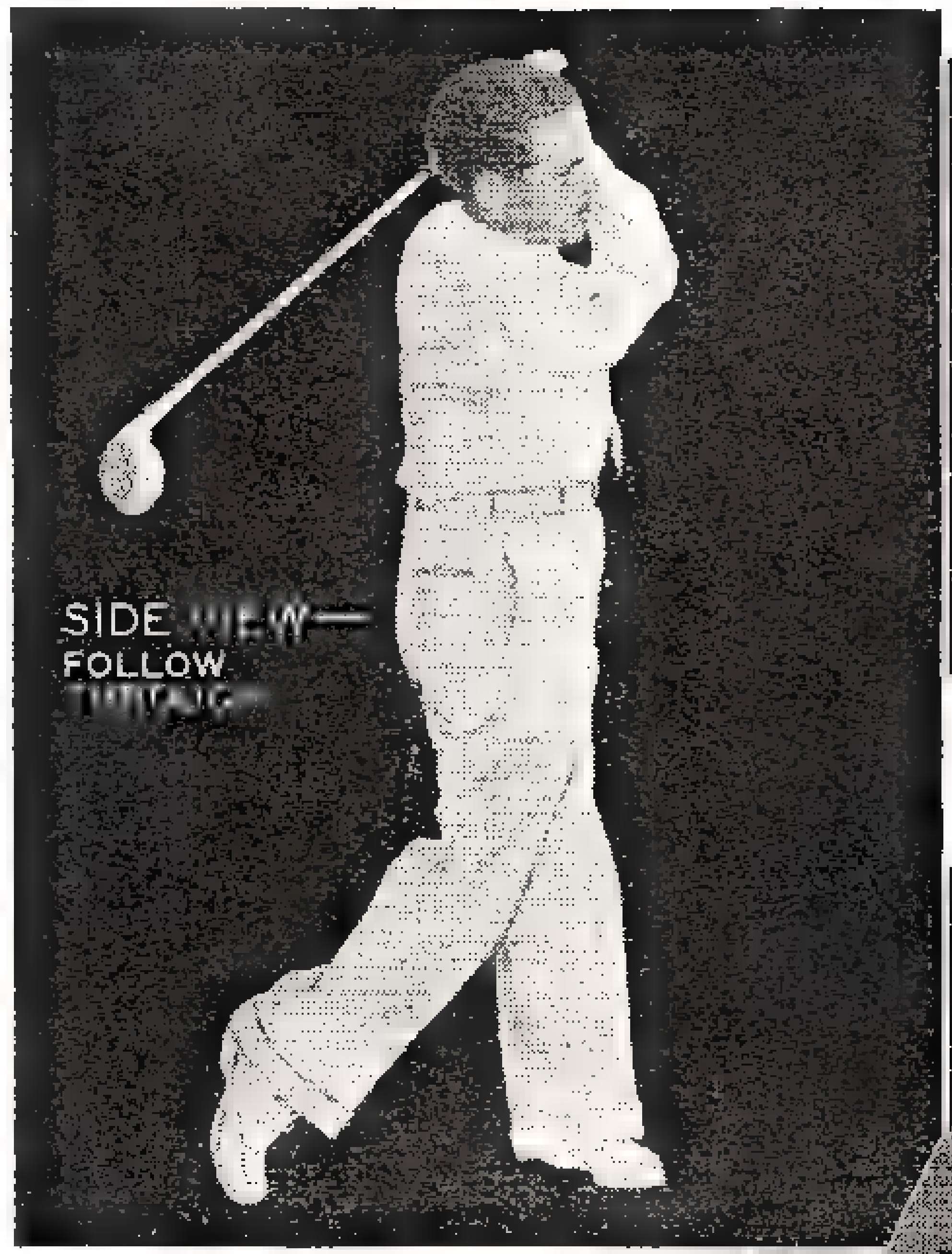
The Fair grounds [illegible] more than three miles long, half a mile wide. Visitors may not realize that much of the ground on which the buildings are erected wasn't naturally ground at all, but the bottom of Lake Michigan. Dredges reclaimed it for the use of man, creating real estate values out of worthless mud.


Japanese Village A section right out of old Nippon.
The Sky Ride! Biggest thrill of the Exposition - Scoot between towers in rocket cars hanging 200 ft. above ground
Field Museum - Natural history exhibits full of dinosaurs and things -
Shedd Aquarium Exposing the private lives of fishes - from sardines to sharks
Byrd's Polar Ship -
Streets of Paris Another high spot - cafes, dance halls - etc.
Amusements 57 varieties of thrills - Battle of Gettysburg Ft. Dearborn Massacre, amazing mechanical thrill-makers.
Enchanted Island Paradise for the youngsters - candy mountains, toy giants, 'n everything (park the kids here)
Electricity - Full of marvels that keep spectators pop-eyed - such as talking kitchens - rays that melt saw blades without injuring human hands - etc.
Adler Planetarium Where sun, moon and stars go through their paces for you - (don't go in here if you have illusions about man's power in the universe)

World's largest stage is being built in Soldier's Field.



TRICK Camera Shots Help BOBBY JONES Teach Golf



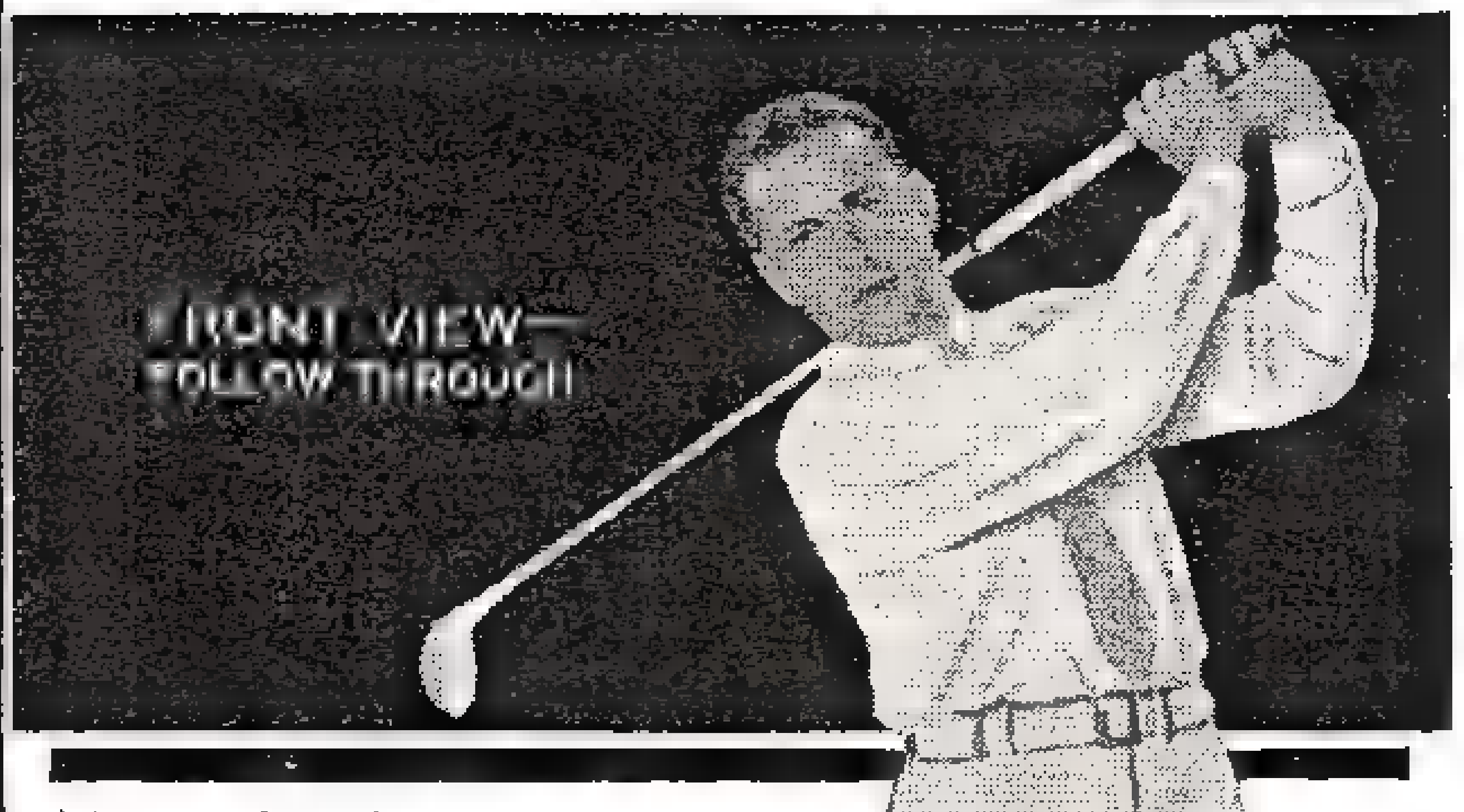
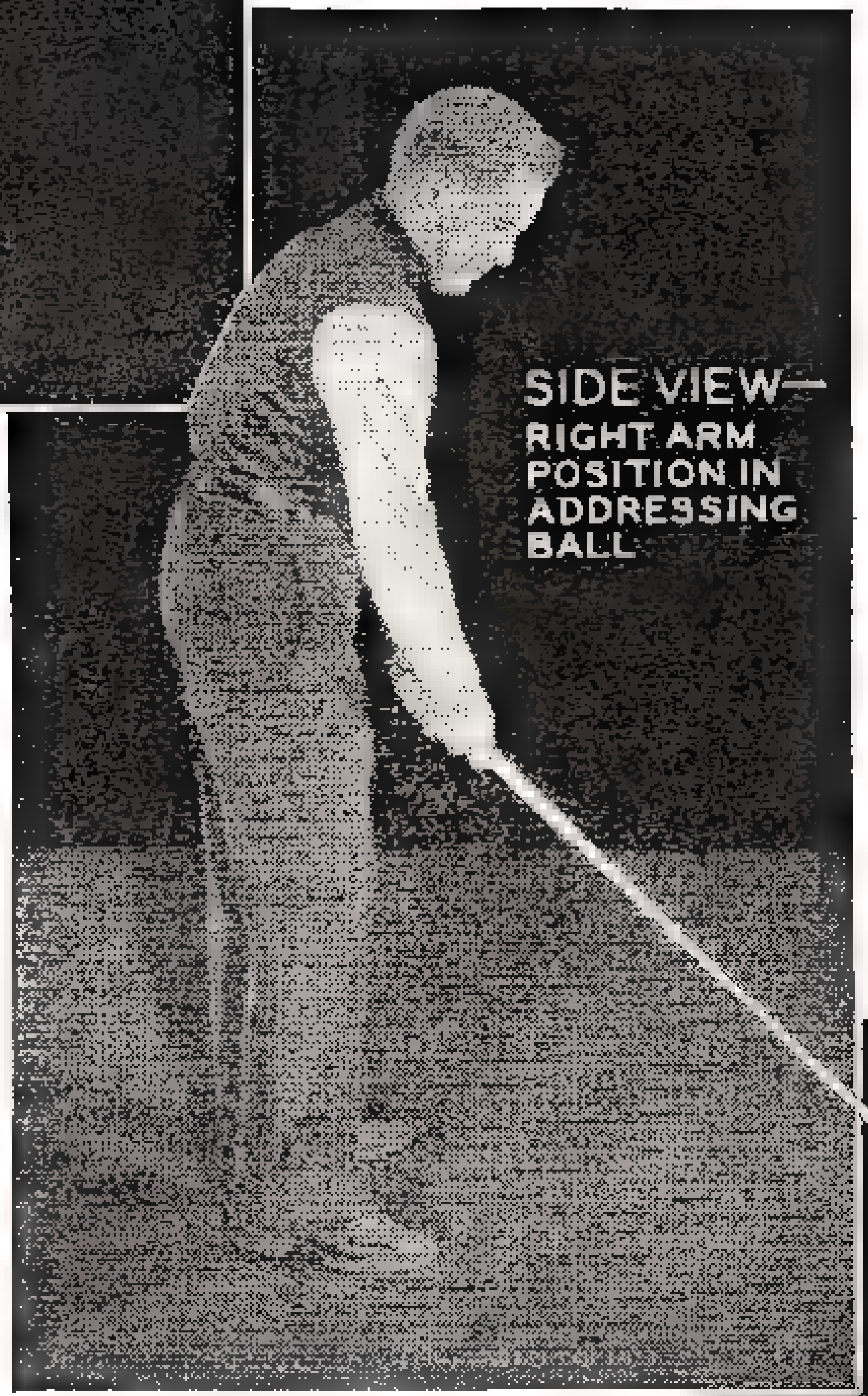
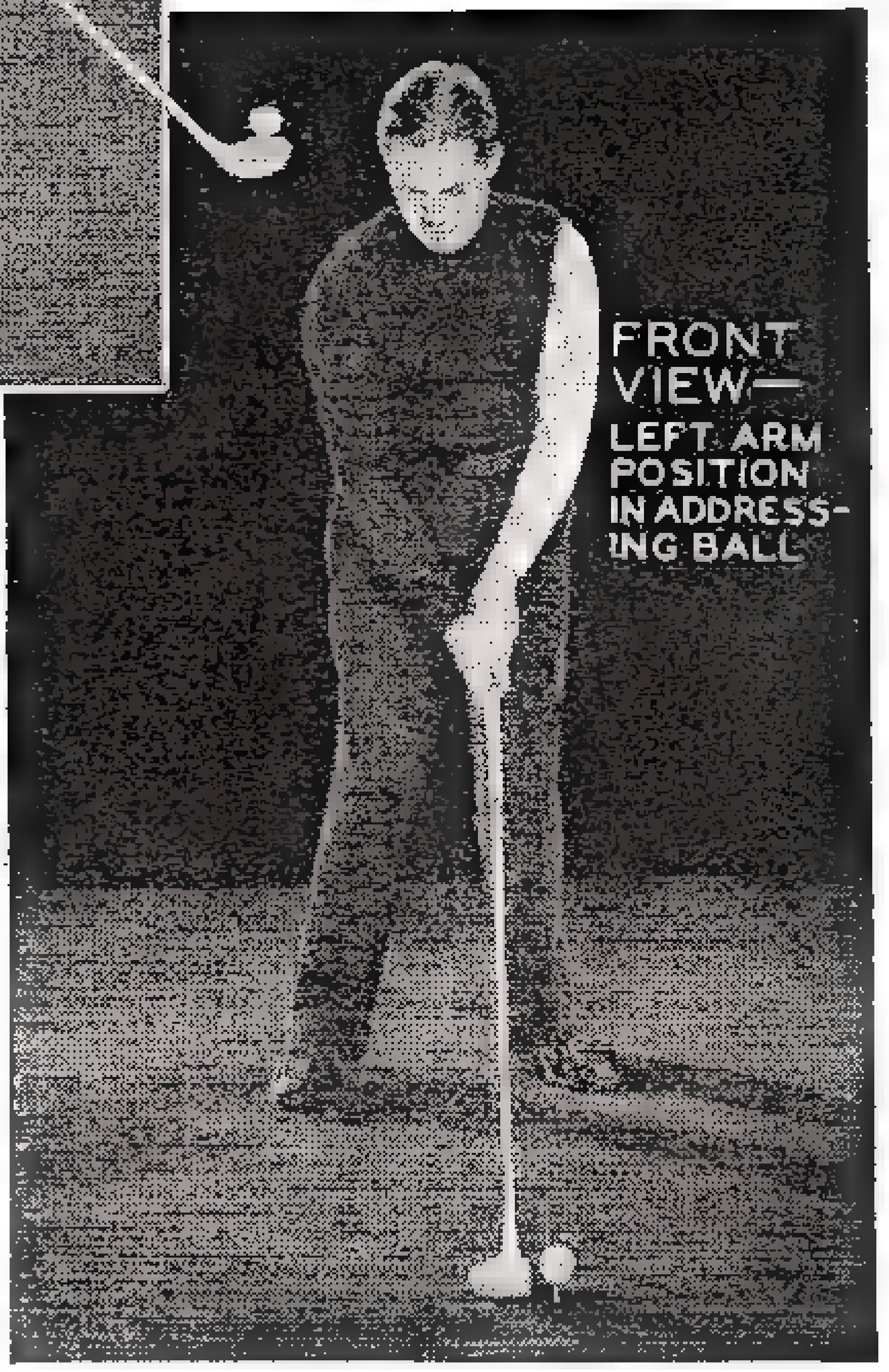


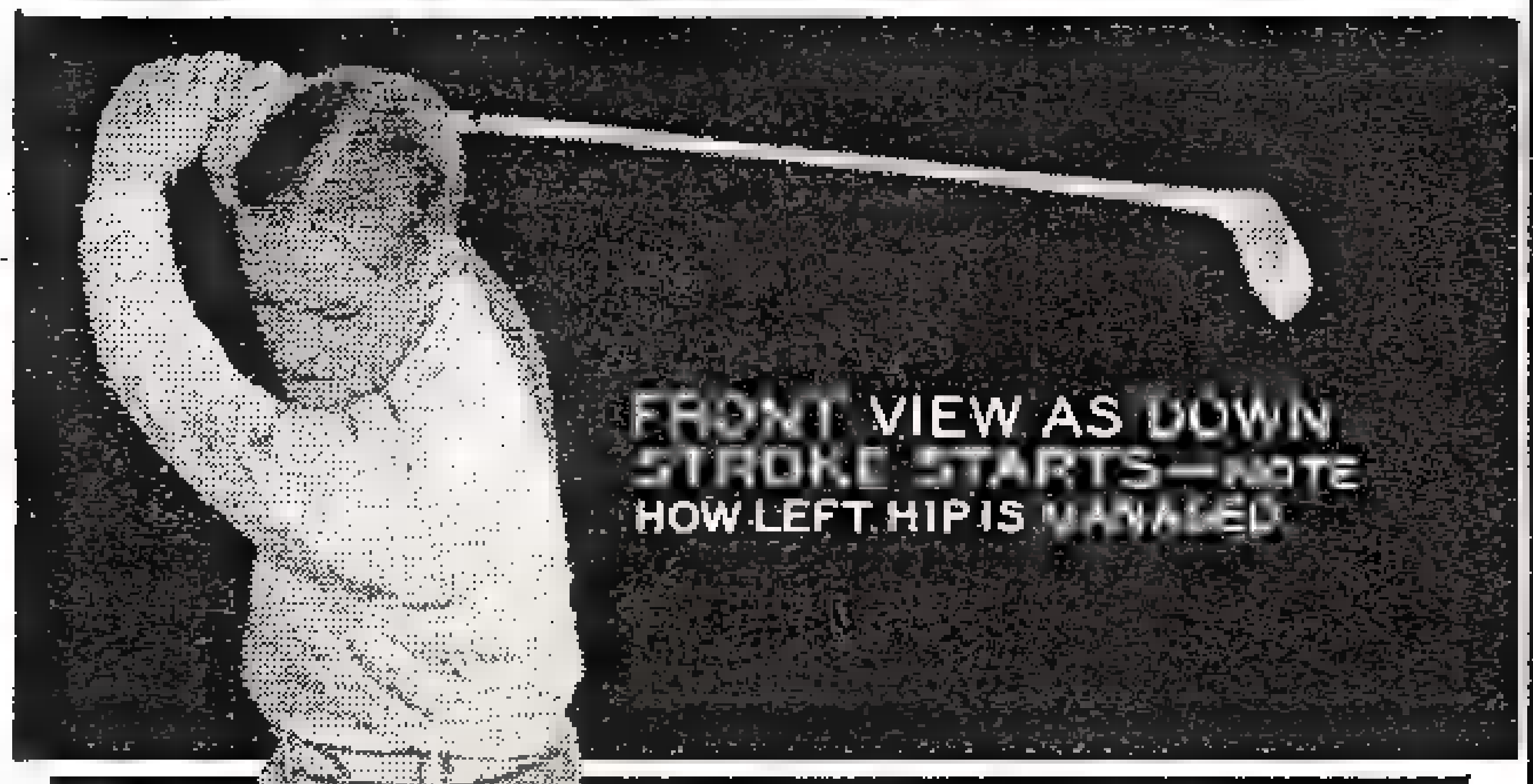
Photo [illegible] right shows how [illegible] bring the powerful muscles of the mid-section of body into action behind the stroke.



Above—All in white, Bobby shows correct position of the entire body in following through after hitting the ball. Right—his right [illegible] standing [illegible] in dazzling white contrast, in proper position for addressing ball.

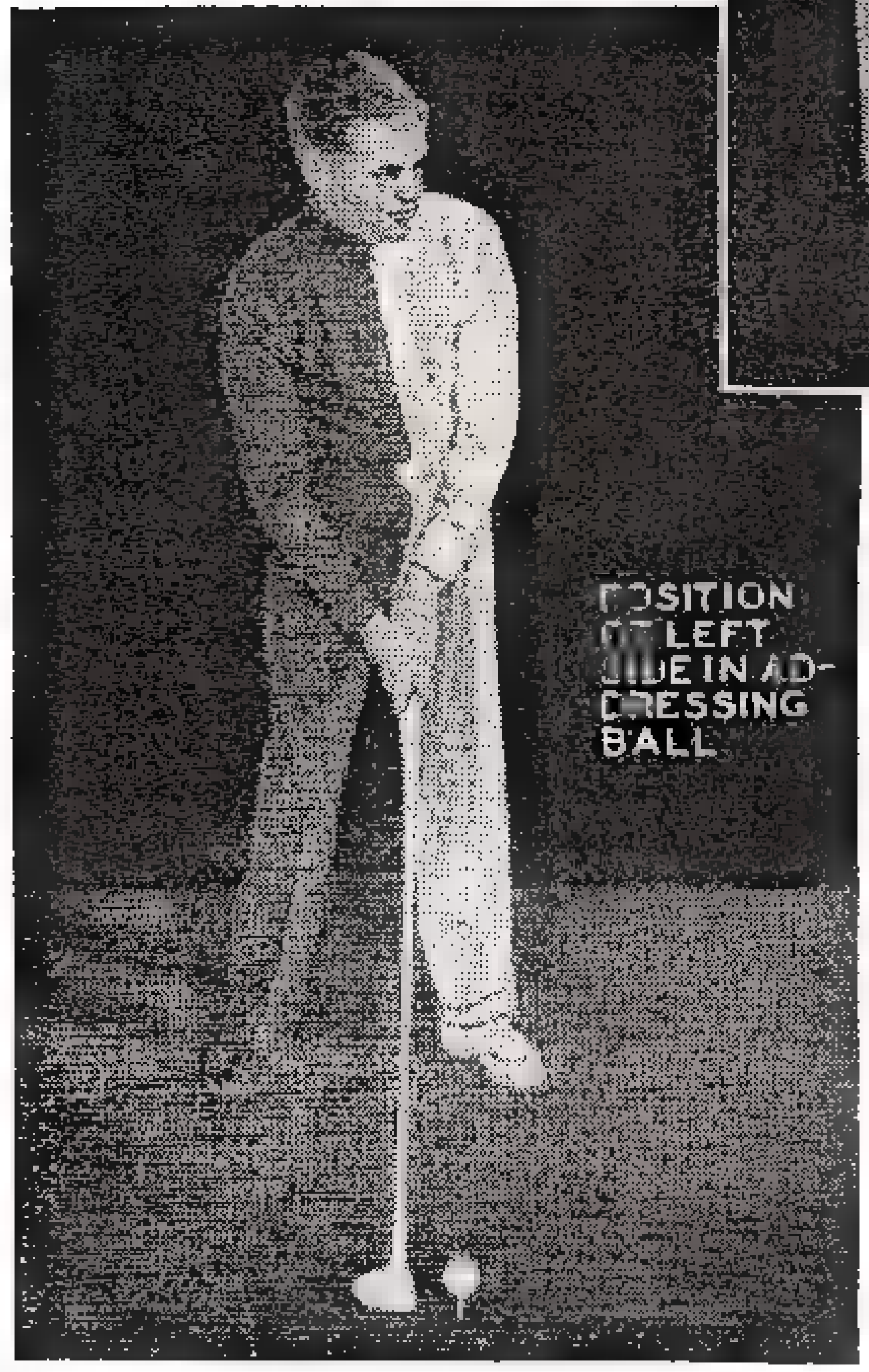
Photo below shows position of left arm. Note also how Bobby stands behind the ball permitting him to move into the shot as he swings.

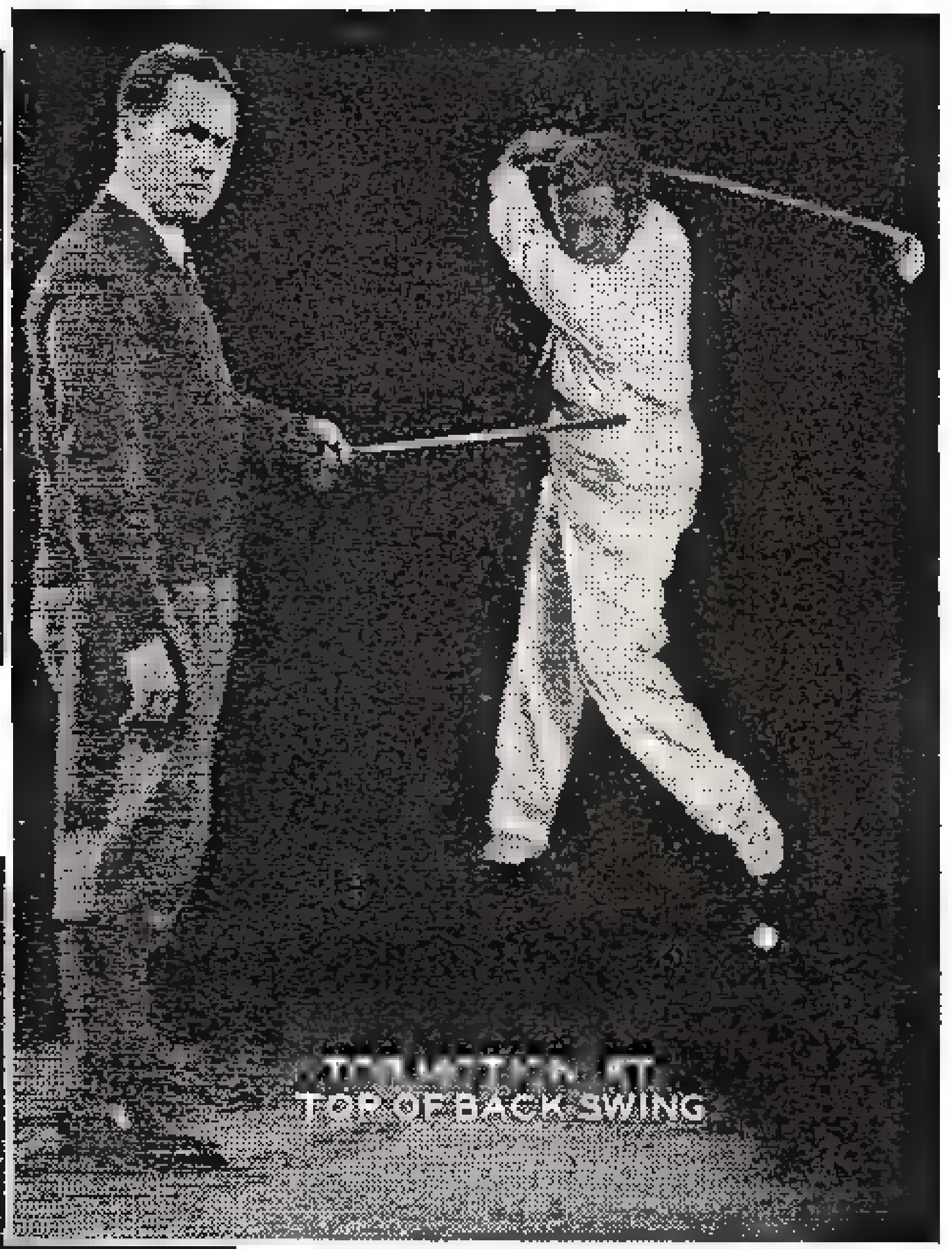


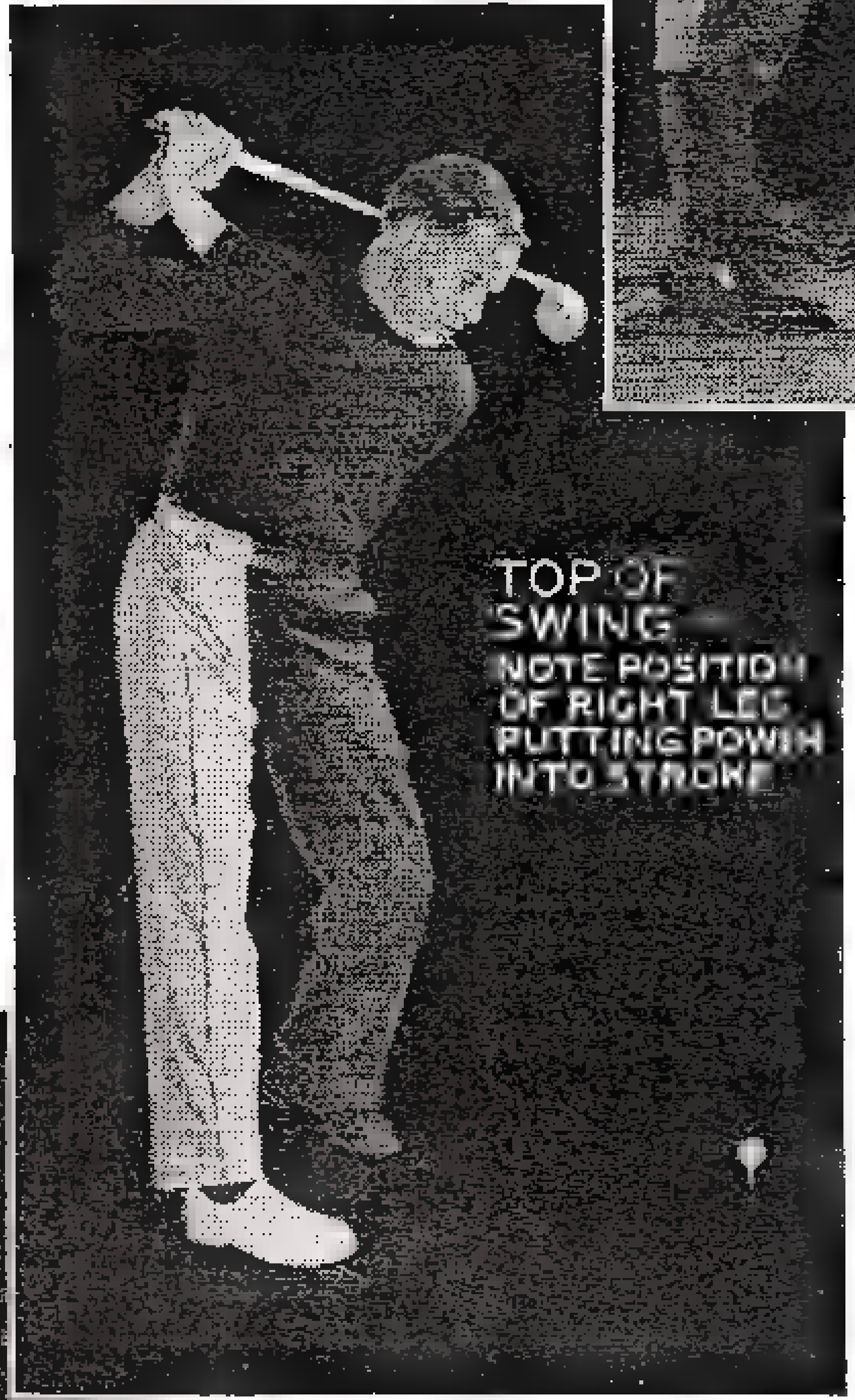


It is important, says Bobby, that left side be taut from hip to hand, as shown at left, when starting the downstroke.

Downstroke swing should be initiated by the hips rather than arms. Photo below shows proper grip.







Above—Bobby points to a stop-motion picture of himself and explains what he is doing. Left—this picture tells better than a thousand words the importance of a straight right leg to give driving power, [illegible] the familiar fulcrum and lever principle.

THE use of the movie camera in teaching golf is nothing new—it's been used any number of times to explain fine points of the game's technique in such a manner that Mr. Duffer can presumably go out on the course, after studying the movie, and wind up joyfully at the 18th hole with a card of 120 or thereabouts, representing something like a 25-point improvement.

But it has remained for Bobby Jones, king of them all, to devise some brand new photographic tricks for his new Warner Brothers movie "How to Break 90." In addition to stop-motion photography, which enables Bobby to halt his swing in mid-air while he stands alongside himself and explains what he is doing, he wears [illegible] assortment of trick black and white costumes which emphasize the action of different parts of the body in executing the perfect golf stroke.

Some of the striking results of this photographic technique are presented on these pages. With Bobby standing against [illegible] black backdrop, dressed entirely in black except for the limb clad in dazzling white whose action is explained, the eye is not distracted by extraneous details.

Essential points of the Jones golf technique are brought out in these photos for the benefit of MODERN MECHANIX AND INVENTIONS readers who may wish to improve their game. Correct address or position as one stands to the ball is well shown in three of the pictures. Note that Bobby stays *behind* the ball where he can move into the shot as he swings through. He says it is best to avoid trying too hard to force the body into a mechanically set position, as it is likely to set up muscle-stiffening tension.

Few golfers, Bobby says, move their hips in the correct way to add force to the drive. Powerful muscles of the back and waist cannot be brought properly into action unless the hips are turned enough to enable the club to swing down to the ball from the inside. Slicing and pulling are attributed to this fault.

In the photo illustrating the top of swing, note how Bobby's right leg, in white, is placed to bring the powerful body muscles into play behind his stroke. The front view of the downstroke gives [illegible] tip on the important matter of handling the left hip. Bobby regards it as important that the hips should move first on the downstroke, before the arms, the left hip leading the turn back to the ball. The entire left side should be taut, from hip to hand, when the club is at the top of the back swing as illustrated.

In the actual movie, slow-motion photography is used while the sound track carries Bobby's own voice.

DEPRESSION *Spurs Lost* Gold TREASURE *Hunts*

Charles Courtney, master locksmith, who recovered part of the sunken gold of the Hampshire. He tells of his adventures in this article.

by BENNETT LINCOLN

Treasure long lost under ocean waters is the golden loot which is luring half a dozen expeditions to recover it, spurred on by the urgent need for gold developing out of the present economic conditions. Charles Courtney, master locksmith who battled death to recover $60,000 from a sunken treasure ship, tells his story of high adventure in this fascinating article.

GOLD, down through the ages a symbol of wealth, has now become so doubly priceless that we in this country may not even legally possess it! Beyond a doubt that is one reason why so many expeditions are at work today recovering the gold of other ages—gold which went down weeks or years or centuries ago, and since that time has been resting uselessly in the mud-filled hulks of ancient galleons.

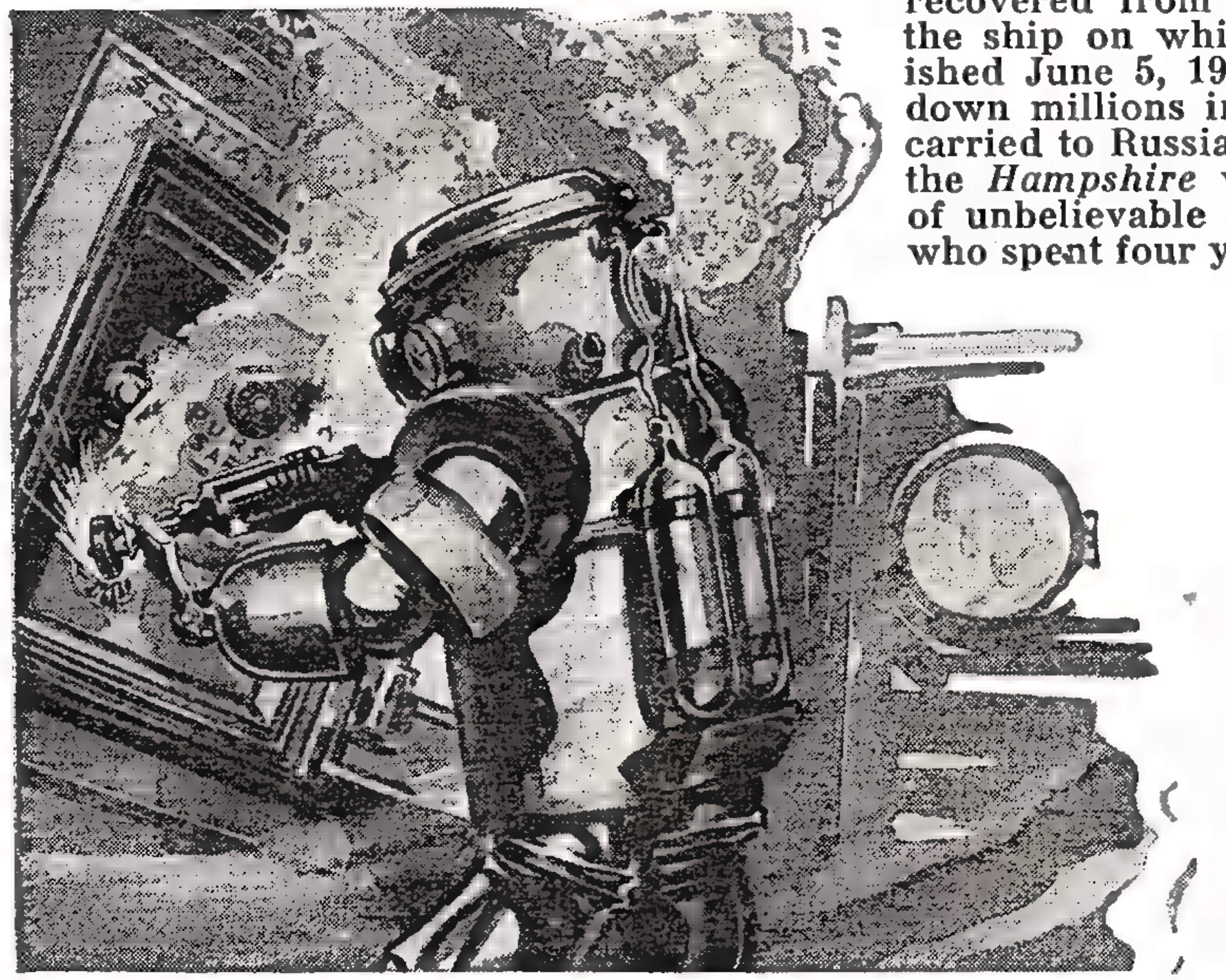
Just how many submarine treasure-hunting expeditions are at work today it is impossible to say, since many of them surround their activities with a veil of absolute secrecy. The purpose which this secrecy serves is easily understood when one realizes that the treasure lure may bring rival salvors to the scene ready to do battle for sunken loot.

A few days ago a coast guard cutter was despatched to a point 60 miles off the Virginia Capes where two rival treasure ships were threatening open conflict. The lure in this case was the sunken *Merida,* which went down 20 years ago after a collision, carrying a reputed $6,000,000 in gold.

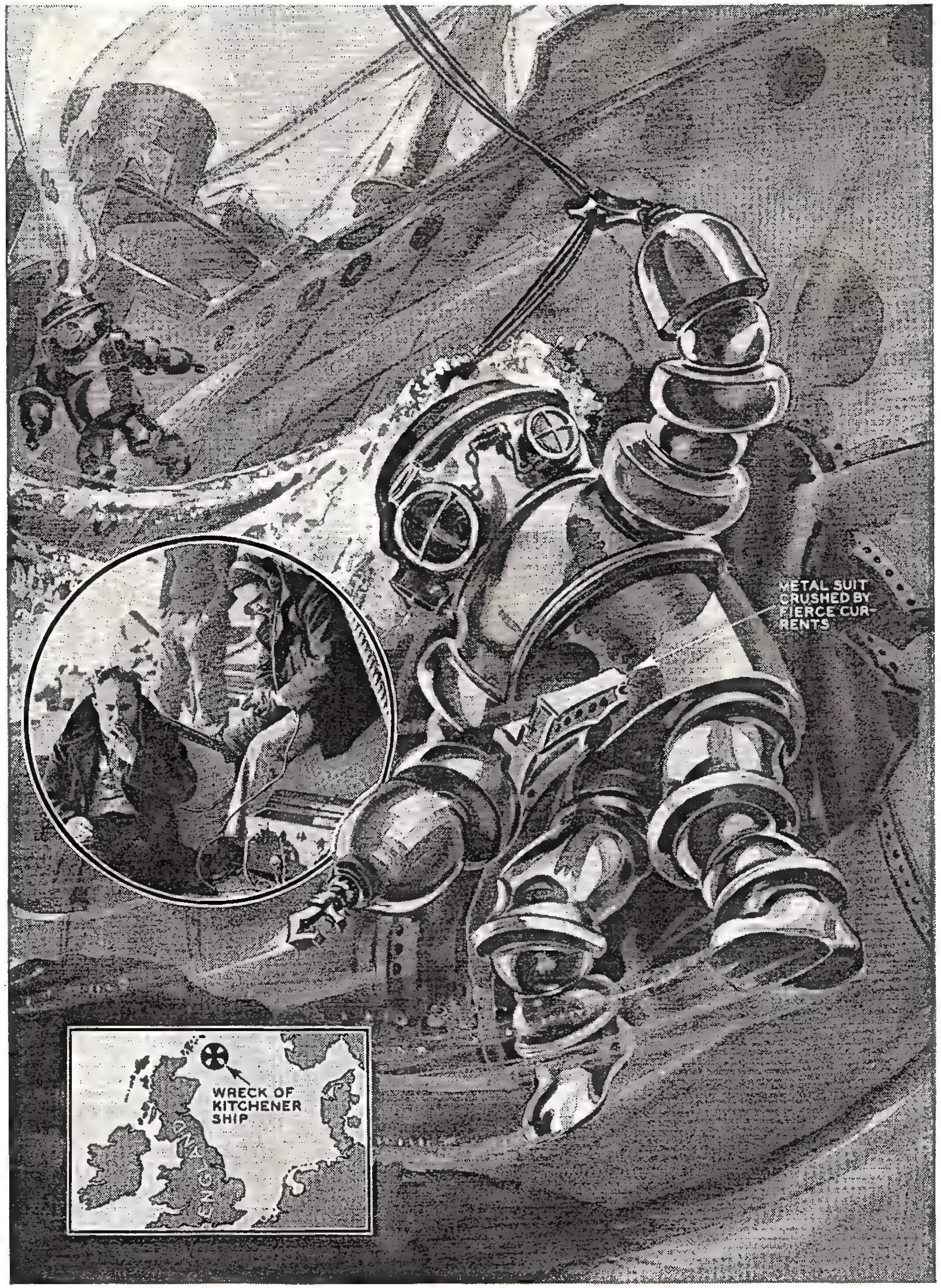
The trawler *Theresa and Dan* and the tugboat *Salvor* were both anchored in the vicinity of the sunken ship. Each called for assistance to prevent an open clash. Eventually both ships retired and the *Merida's* gold still remains for the lucky salvor.

Perhaps the most striking of recent hunts for lost ships is that in which $60,000 was recovered from the sunken *Hampshire,* the ship on which Lord Kitchener perished June 5, 1916. With the boat went down millions in gold which was being carried to Russia. Just how the wreck of the *Hampshire* was located in the face of unbelievable difficulties by a "Mr. X" who spent four years tracing down a German who worked on the boat which left the mine that sank the *Hampshire,* is a story in itself.

More thrilling were the adventures of Charles Courtney, master locksmith, who personally recovered a strong box from the *Hampshire's* safe containing $60,000. Readers of MODERN MECHANIX AND INVENTIONS

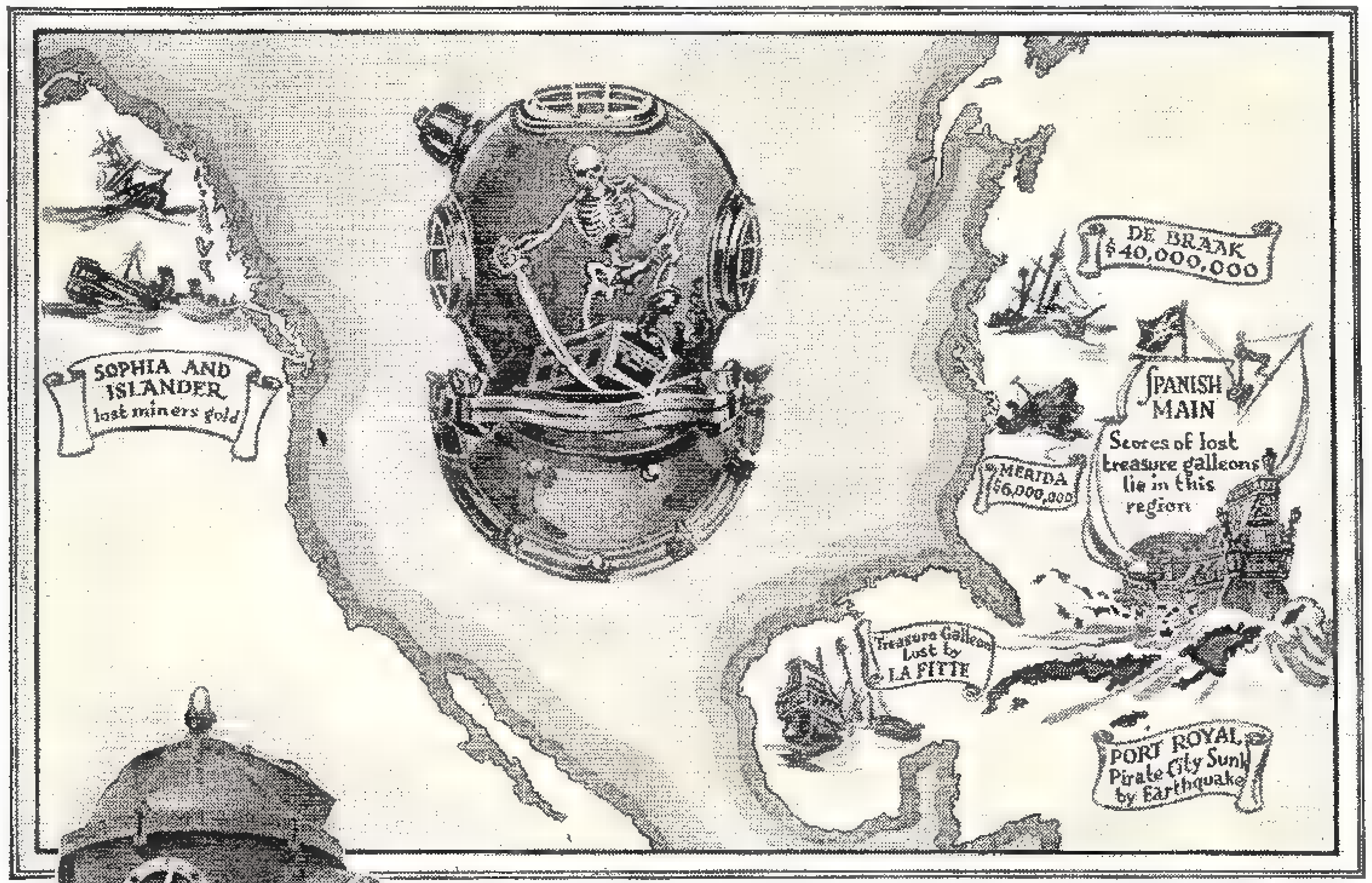


At left—Courtney bored open the sunken Hampshire safe with a grindstone drill and removed a strongbox containing $60,000 in gold. He had to work with extreme care to avoid setting off possible T.N.T. triggers within the safe.

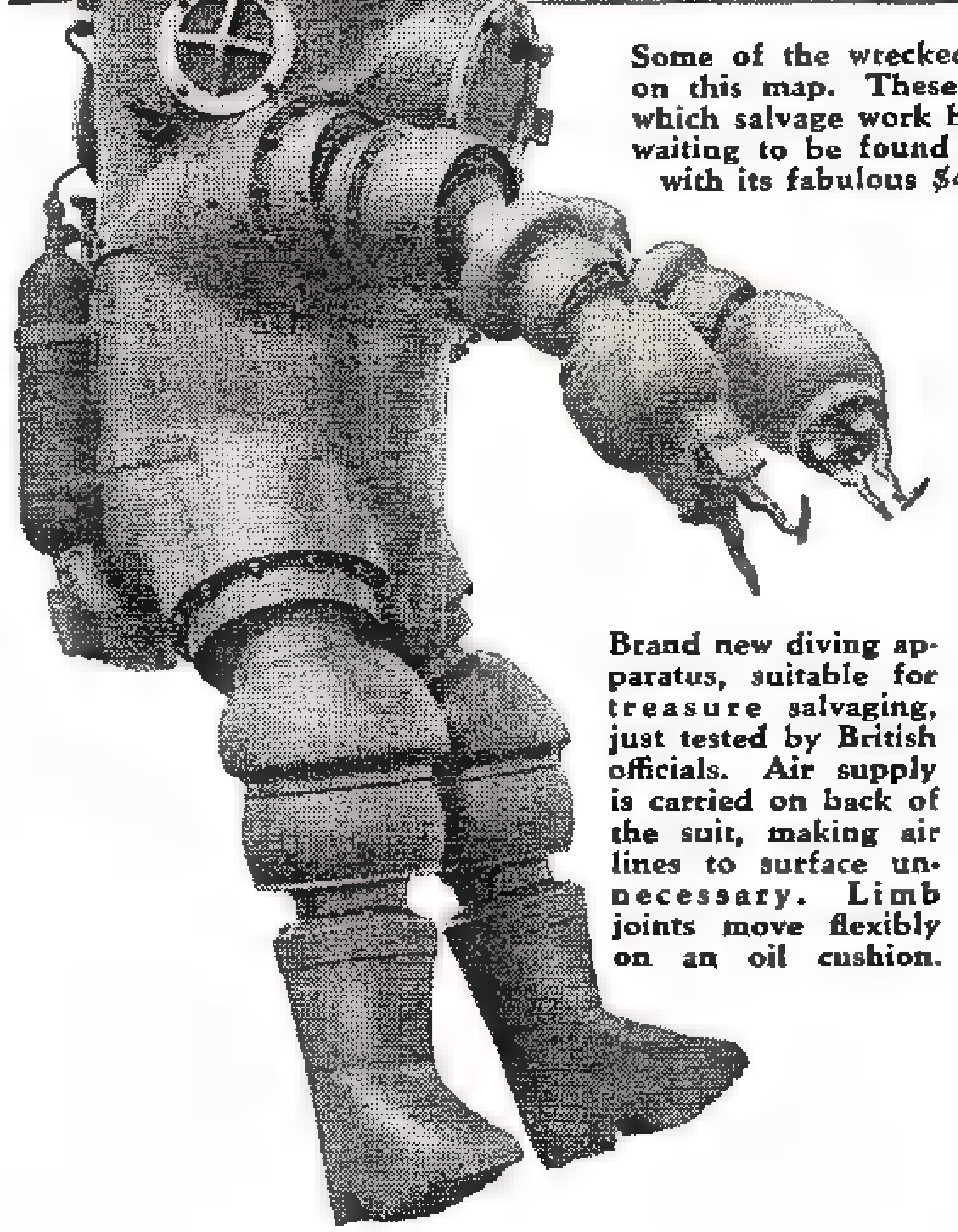

METAL SUIT CRUSHED BY FIERCE CURRENTS
WRECK OF KITCHENER SHIP
ENG

Charles Courtney's long battle with death when treacherous currents crushed him irresistibly against the hulk of the sunken treasure ship, is illustrated. In circle—how telephone communication is maintained. Map shows sunken Hampshire.

Treasure Wrecks Dot Shores of Our Continent—Many Still Unfound


SOPHIA AND ISLANDER lost miners gold
DE BRAAK $40,000,000
SPANISH MAIN Scores of lost treasure galleons lie in this region
MERIDA $6,000,000
Treasure Galleon Lost by LA FITTE
PORT ROYAL Pirate City Sunk by Earthquake

Some of the wrecked treasure ships of the American continent are pointed out on this map. These are only those which have been definitely located and on which salvage work has been done. Scores of others lie in spots as yet unknown, waiting to be found through old records—just as the location of the De Braak with its fabulous $40,000,000 in gold was recently discovered after long search.



Brand new diving apparatus, suitable for treasure salvaging, just tested by British officials. Air supply is carried on back of the suit, making air lines to surface unnecessary. Limb joints move flexibly on an oil cushion.

will remember Mr. Courtney's own story of his methods of opening the safe on the sunken *Egypt* in an eminently successful salvage venture which up to date has recovered $3,250,000.

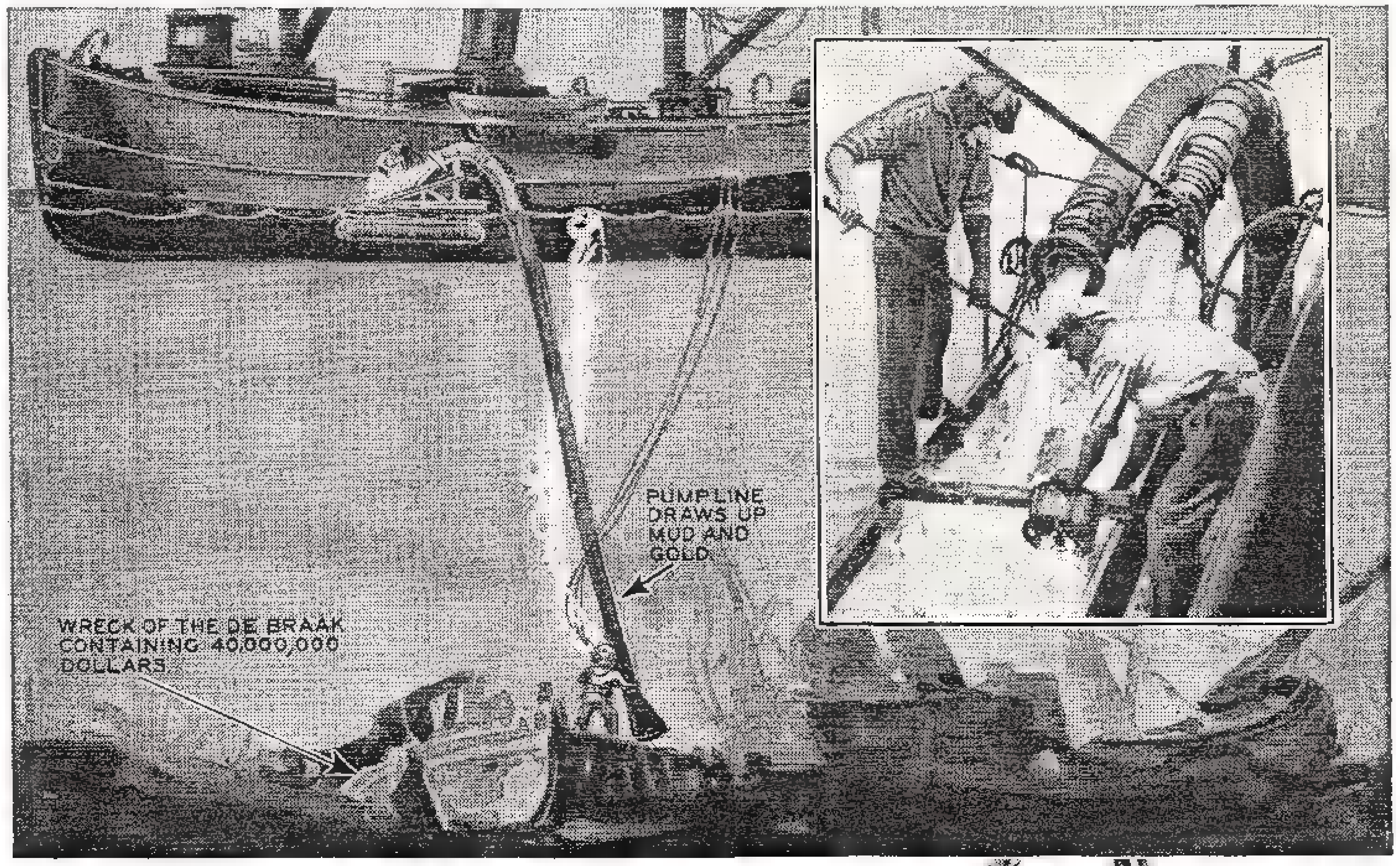
Mr. Courtney is president of the American Association of Master Locksmiths, and so widespread is his fame that when a man was needed to unlock the safes of the *Hampshire*, Mr. X came from the other side of the sea to seek his services. Courtney accepted the commission, veiled in secrecy, little knowing that before he had completed his contract he would very nearly have paid with his life, and that he would carry a shattered wrist and hair prematurely whitened by terror as a permanent reminder of a disastrous bout with death.

Sitting in his New York office, the master locksmith told me the terrifying story of his experiences for readers of this magazine. He told me of being taken aboard the salvage ship, of a zig-zag course taken to the treasure site to elude possible pursuers, of the location of the wreck—and finally of his own part in the drama.

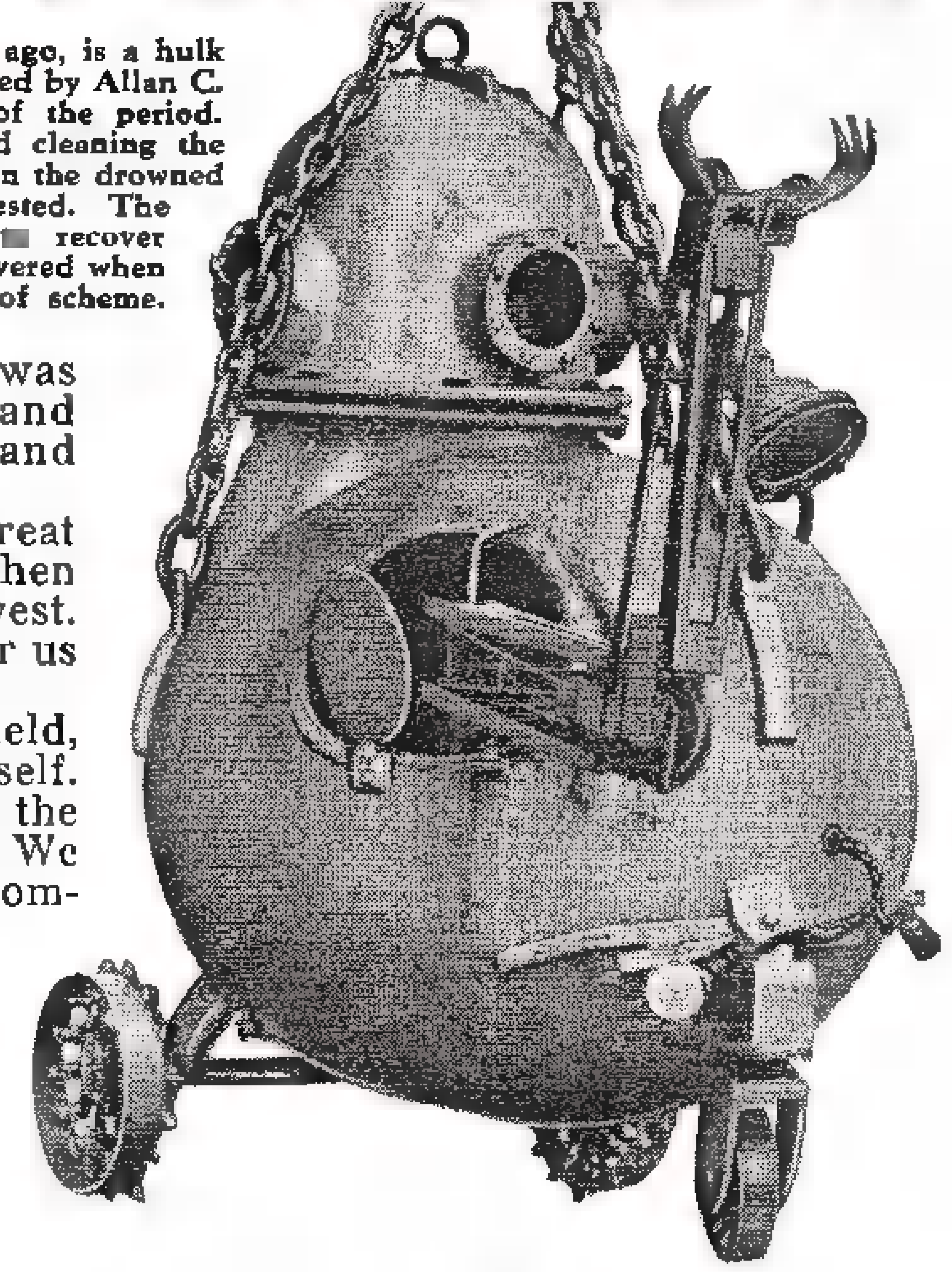
"Right after the ship was identified, I started my diving work. I went down and with the use of a grindstone drill succeeded in boring open a built-in safe in the ship. That was a mighty difficult job, cracking that safe. I had to guard against T-N-T triggers or other safeguards which its makers might have secreted in it. I blew it open without mishap, however, and withdrew from it a strong box which I later discovered contained about $60,000 in gold.

"I went down once again after recovering that strong box with the $60,000. You see there was no possible way of opening those safes without my presence down there. It was impossible to calculate the nature of the tumblers because of the havoc of time. The only method we could employ was to locate the safes and figure out the best and most harmless way of blasting them open, and still regain the treasures they held.

Long Lost De Braak, Carrying $40,000,000, Found After Long Search


PUMP LINE DRAWS UP MUD AND GOLD
WRECK OF THE DE BRAAK CONTAINING 40,000,000 DOLLARS

The De Braak, sunk off Cape Henlopen, Delaware, decades ago, is a hulk reputed to contain $40,000,000 in gold. It has just been located by Allan C. Robertson after a long, romantic search through records of the period. Salvaging will be done by pumplines, sucking up mud and cleaning the "bones" of the hulk to make it easy for divers to lay hands on the drowned gold. Inset photo shows the powerful pumplines being tested. The photo at right shows weird machine used by syndicate to recover gold from the Islander, sunk off Alaska. Some gold was recovered when dissension among members forced temporary abandonment of scheme.



"By April 24 there had already been a great deal of blasting work. This was the day when we were to reap our hard-fought for harvest. There was $10,000,000 lying there waiting for us to bring it back to civilization.

"Down we went, Costello, Samuel Mansfield, an adventurous youth from Virginia, and myself. We were in our aluminum suits. We had the customary equipment and auxiliary devices. We used our telephones constantly, keeping in communication with the engineers on deck of the salvage boat. As my two companions and myself were let down on the second descent the first 100-foot drop was without a hitch. At 200 feet I was suddenly seized with misgivings. Something was wrong.

"I was cut off from communication with my other two comrades. Fear of darkness overcame me—darkness as smothering, as all-enveloping as the inside of a coffin.

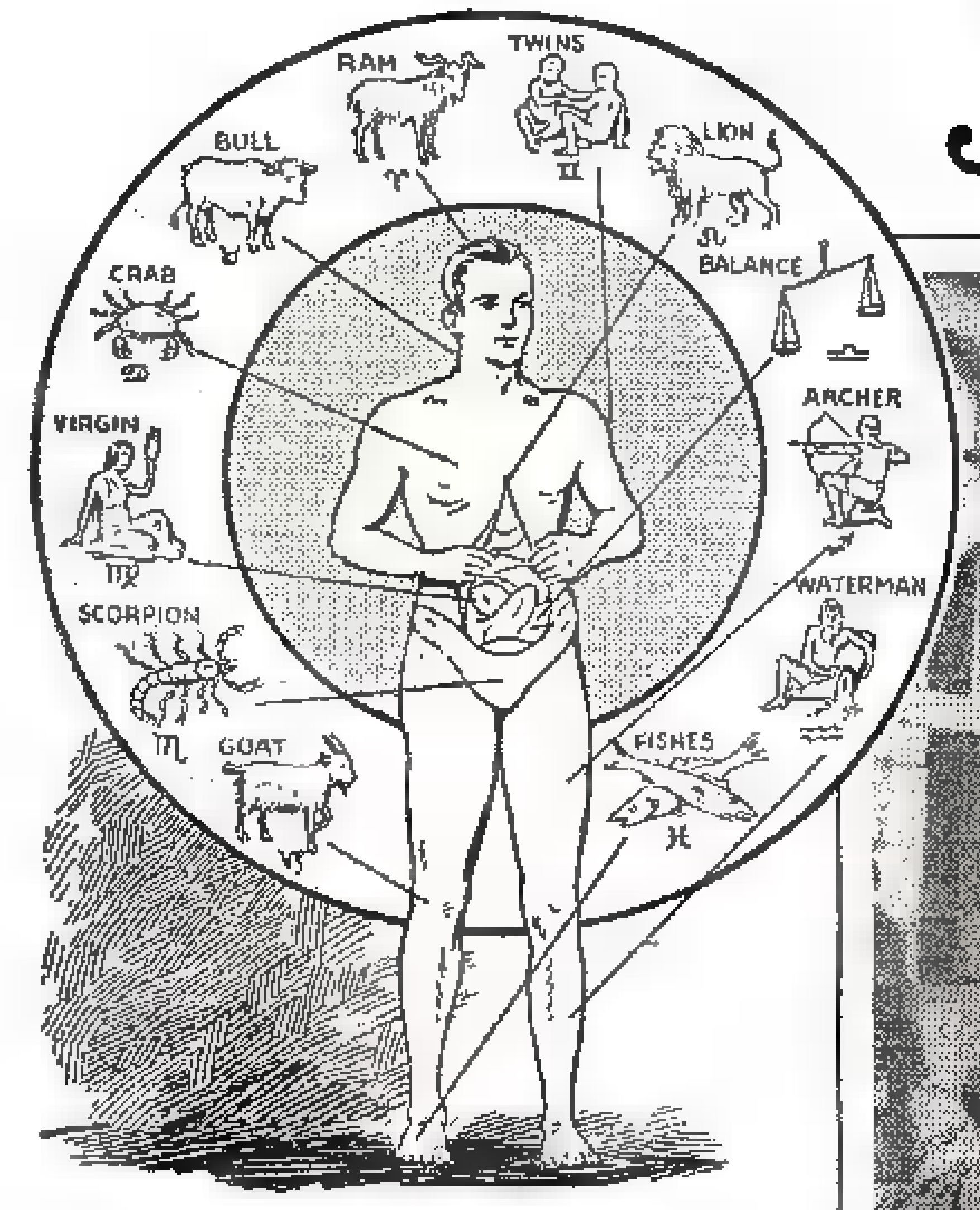
" 'Bring us up quick! We've been struck by an undertow!' I yelled desperately.

"But no response. No signal or other token that those on the surface got my S O S. Having had experience as a diver I tried to be calm. I figured, or tried to figure as calmly as I could, that those above were waiting for the current to ease. I could not budge the cables. The electricity was cut off so that there could not be a short circuit.

"In another moment I was seized with a terrifying sensation. As I dangled there helplessly, hoping and praying for rescue, my suit was cut in the right side. I was flung violently against the side of the *Hamp-*

(Continued on page 8)

Secrets of Cures by Ancient Medicine Men



The ancients believed that the stars determined the course of human affairs. Astrologers consulted the zodiac, shown above, to learn when it was safe to bathe, get [illegible] haircut, take medical treatment, and [illegible] forth.

Shrine at Lourdes, France, showing crutches discarded by afflicted persons cured by faith.

by

EARLE R. BUELL

Cheer up, have faith—it's good for your health. That's the verdict of scientists who have been experimenting to determine effectiveness of remedies employed by ancient medicine men, astrologers, and modern faith healers. This article explains why some people actually do get well when they have [illegible] strong belief they are going to get well.

OPTIMISM is better than apples for keeping the doctor away.

There is a scientific basis for faith healing.

Even some ancient superstitions had healing power and the hocus-pocus of the tribal medicine man may have saved many lives.

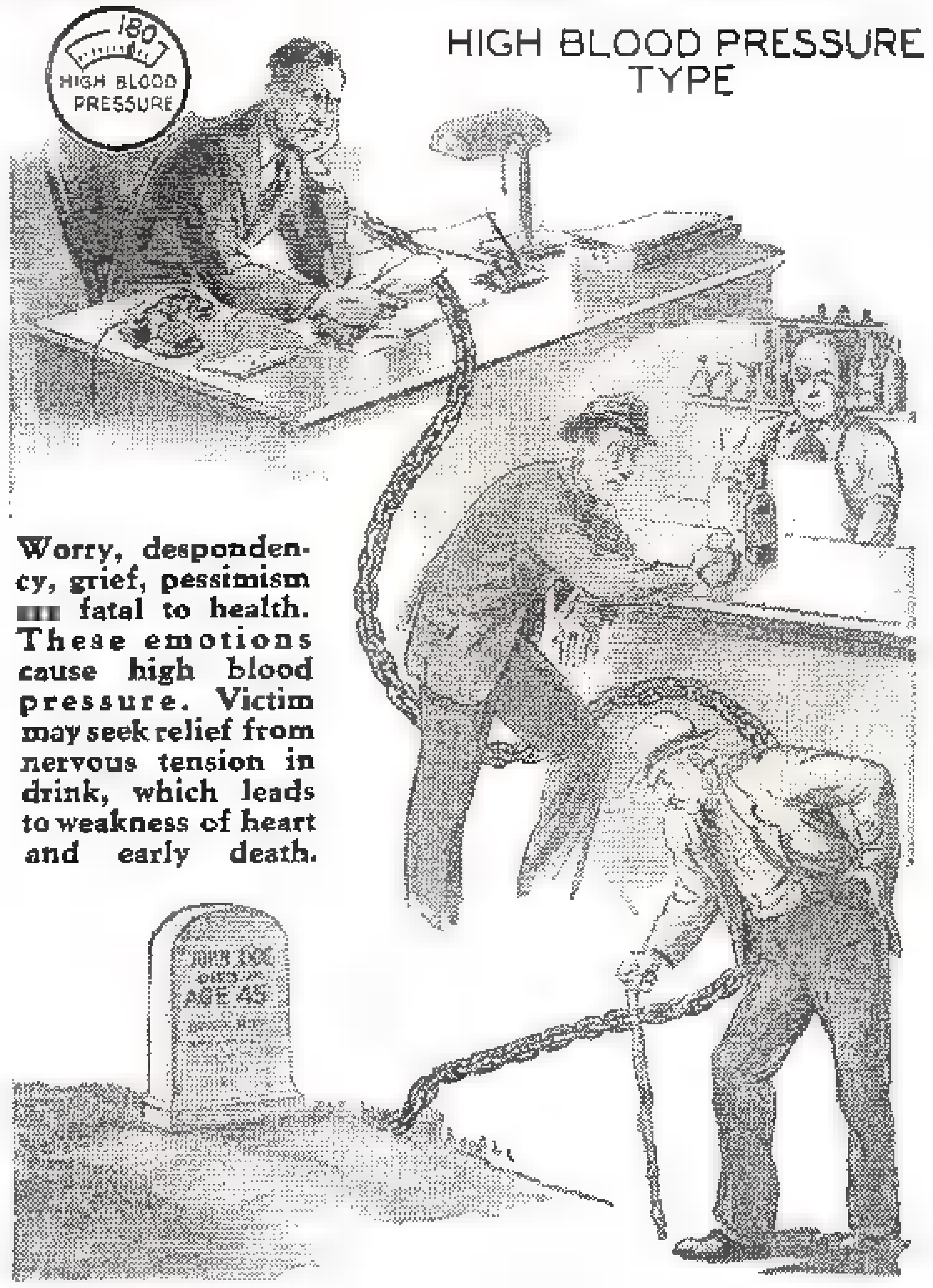
These are some of the conclusions arrived at by a group of experimenters who have been endeavoring to test out the effect of states of mind upon the general health.

Applying the scientific methods of the clinic and the laboratory to their work, the investigators at first set out to find out which if any of the healing systems widely practiced by various cults could be shown to have any therapeutic value. Very much to their amazement they found evidence that not only these cults but any religion devoutly accepted by the individual had certain definitely traceable physical effects of [illegible] beneficial nature.

The discoveries went even farther, indicating that any optimistic or inspiring thought was valuable for healing and that some miraculous appearing cures had actually been effected by the reassuring words of a doctor in whom the patient had confidence without any treatment at all.

On the other hand, it was found that [illegible] long list of emotions related to fear had exactly opposite effect and that to embrace [illegible] philosophy of pessimism was about on [illegible] par with warming an asp in the bosom.

HIGH BLOOD PRESSURE TYPE

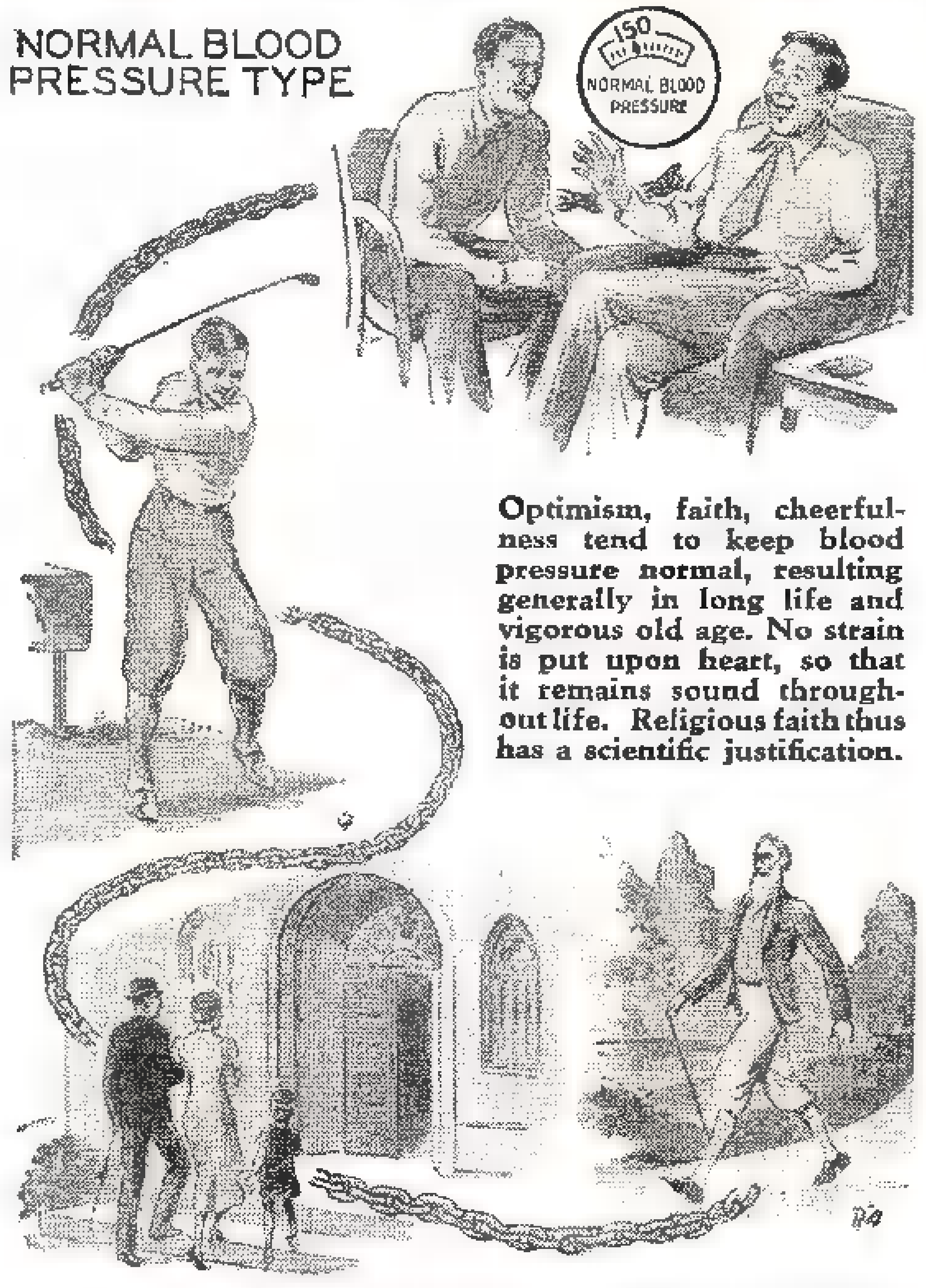


Worry, despondency, grief, pessimism [illegible] fatal to health. These emotions cause high blood pressure. Victim may seek relief from nervous tension in drink, which leads to weakness of heart and early death.

Worshippers praying at grave of a priest for deliverance from physical ailments. Belief in potency of prayer frequently results in cure, experimenters have found.

While mystic hocus-pocus of ancient medicine [illegible] was scientifically impractical, it actually cured some sufferers who strongly believed they were going to get well.

NORMAL BLOOD PRESSURE TYPE



Optimism, faith, cheerfulness tend to keep blood pressure normal, resulting generally in long life and vigorous old age. No strain is put upon heart, so that it remains sound throughout life. Religious faith thus has a scientific justification.

Instead of being able to find out which sect was nearest to the truth as had been intended, experimenters found that truth or falsity of a sincere belief seemed to make no appreciable difference in its curative effect. This gave rise to the realization that countless supposedly silly superstitions had probably improved the health of those who believed in them.

As a result, there arises the possibility of testing the sincerity of religious convictions by means of the blood pressure gauge and other instruments and, while it is not suggested that these instruments will be installed at the church altars, there is said to be ample evidence that positive results could be obtained by this means.

The findings of the experimenters have dovetailed to a large extent with those of Dr. William S. Sadler of Chicago University, although the experimenters were without a knowledge of Dr. Sadler's works, and they are taken to be mutually corroborative.

They are said also to be in line with the prophecy of Dr. Charles P. Steinmetz, famous physicist, who shortly before his death predicted that science in the near future would turn to spiritual matters and that developments in this field would be similar to those in the physical and material realm.

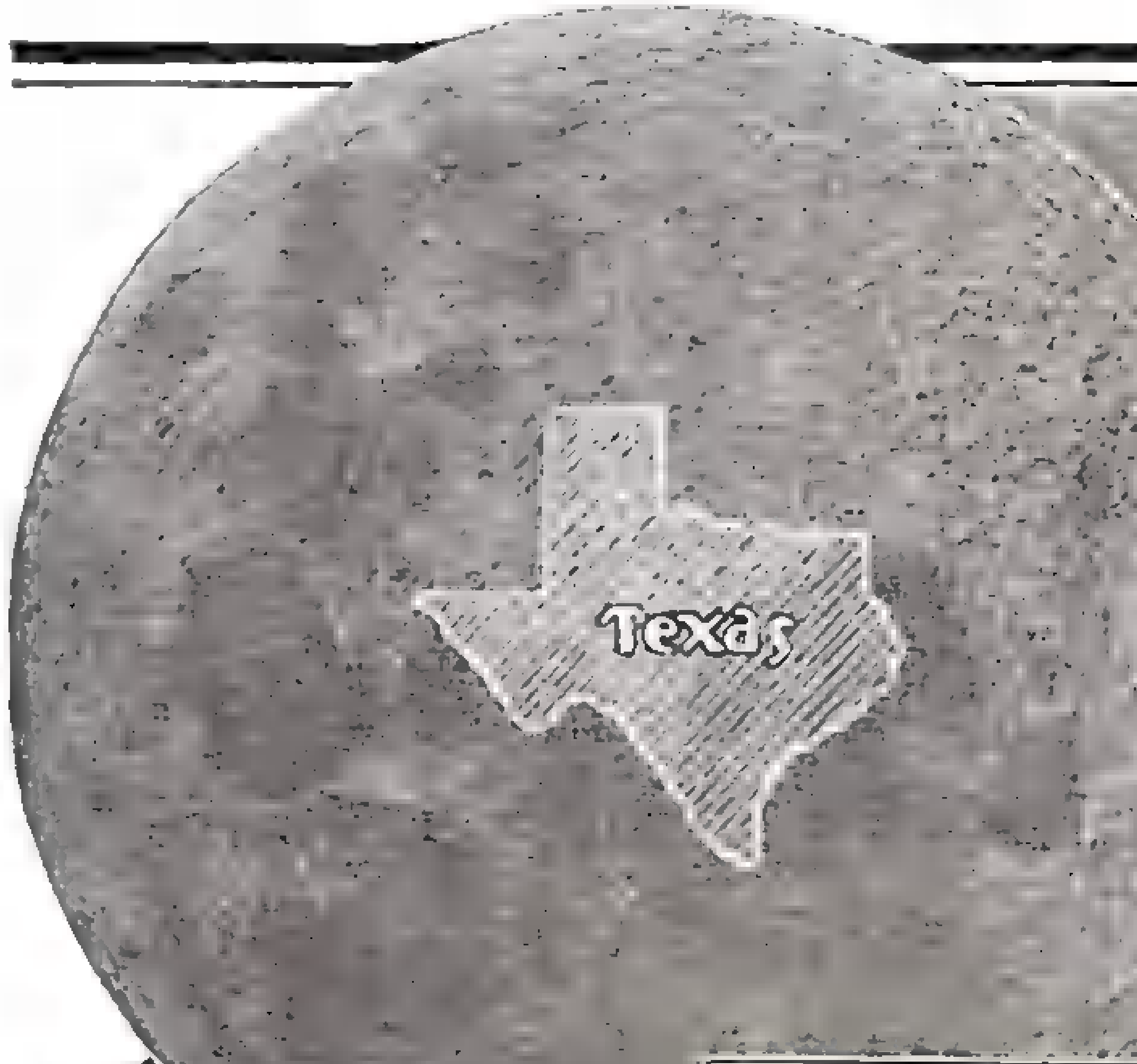
One of the more remarkable discoveries recently made is that there is apparently a scientific basis for the healing principles of faith, hope and charity or love as described in the Bible and it is indicated that any inspiring writings and the encouraging or uplifting words of any admired or revered speaker may be sufficient to effect rather startling cures in some instances.

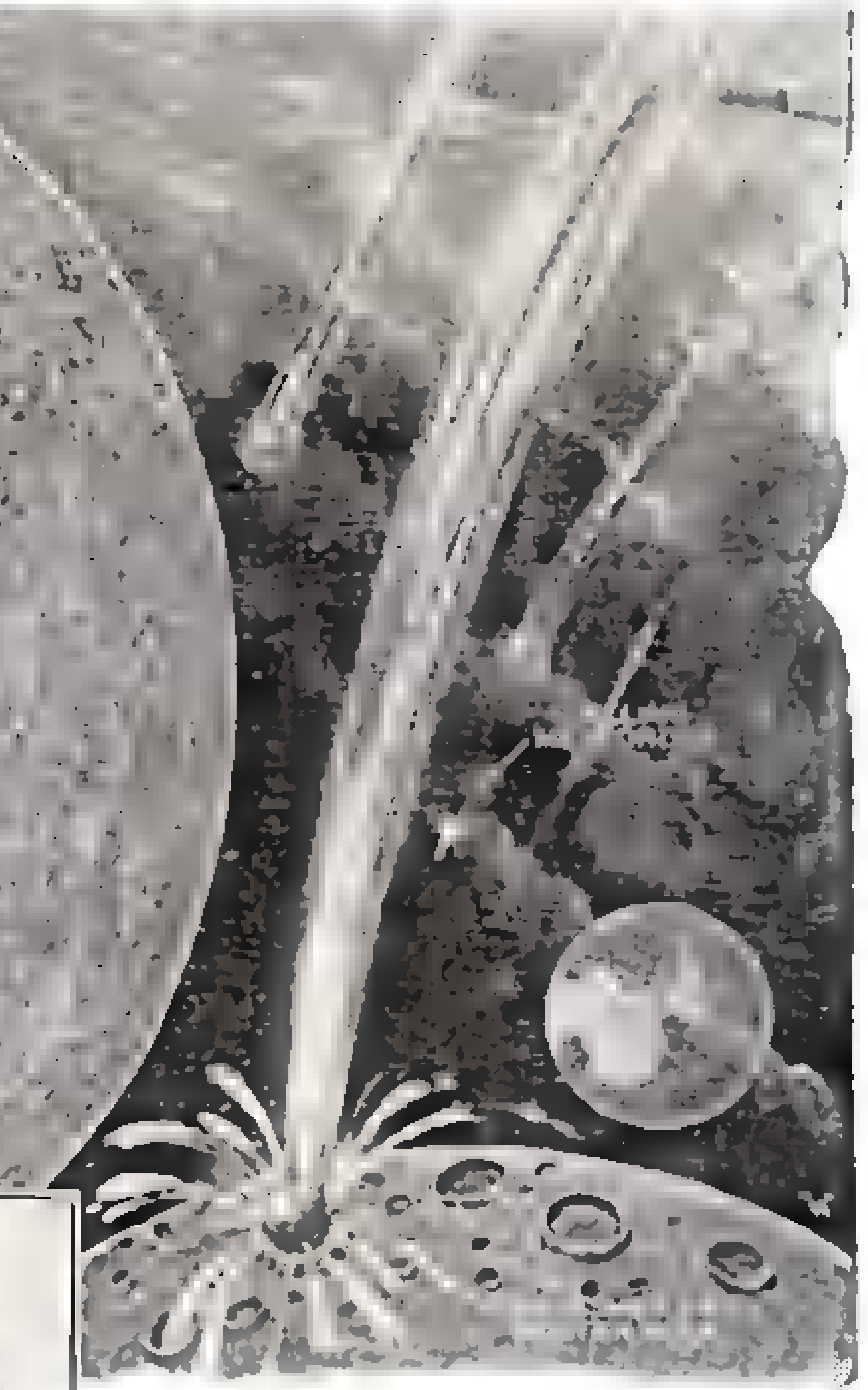
The time may very well come when a doctor's prescription will read: "See your priest, minister or other religious adviser." Public intuition has for some time been directing large numbers of persons back to their churches for physical as well as mental and spiritual assistance, it is said, and a period of increased interest in the church is prophesied.

Beginning first with a study of religious

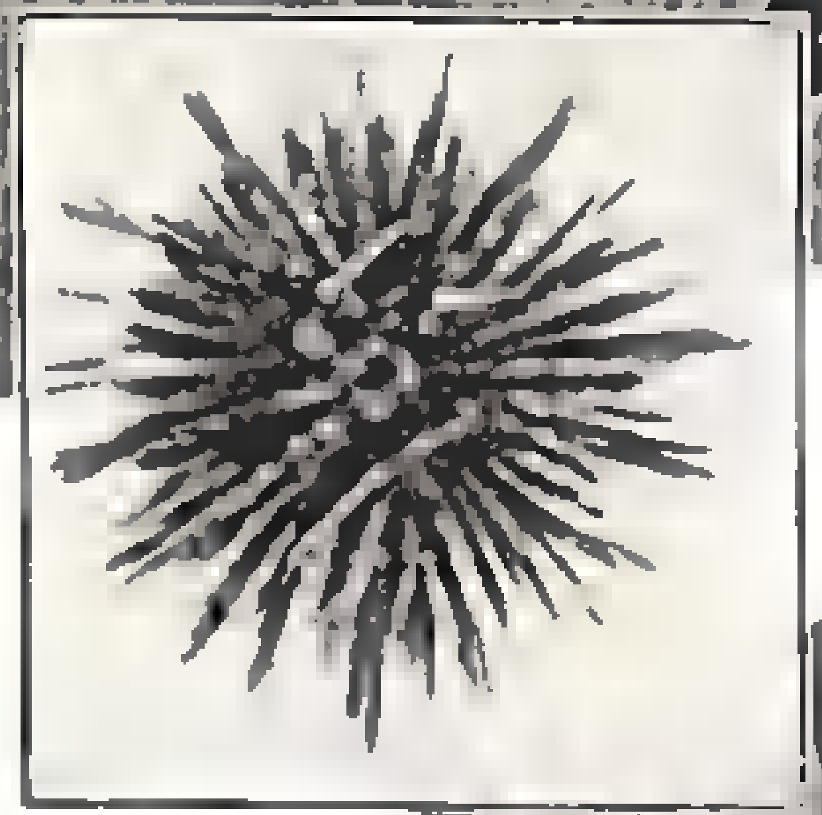
GETTING *More* LIGHT On the *MOON*

by CALVIN FRAZER

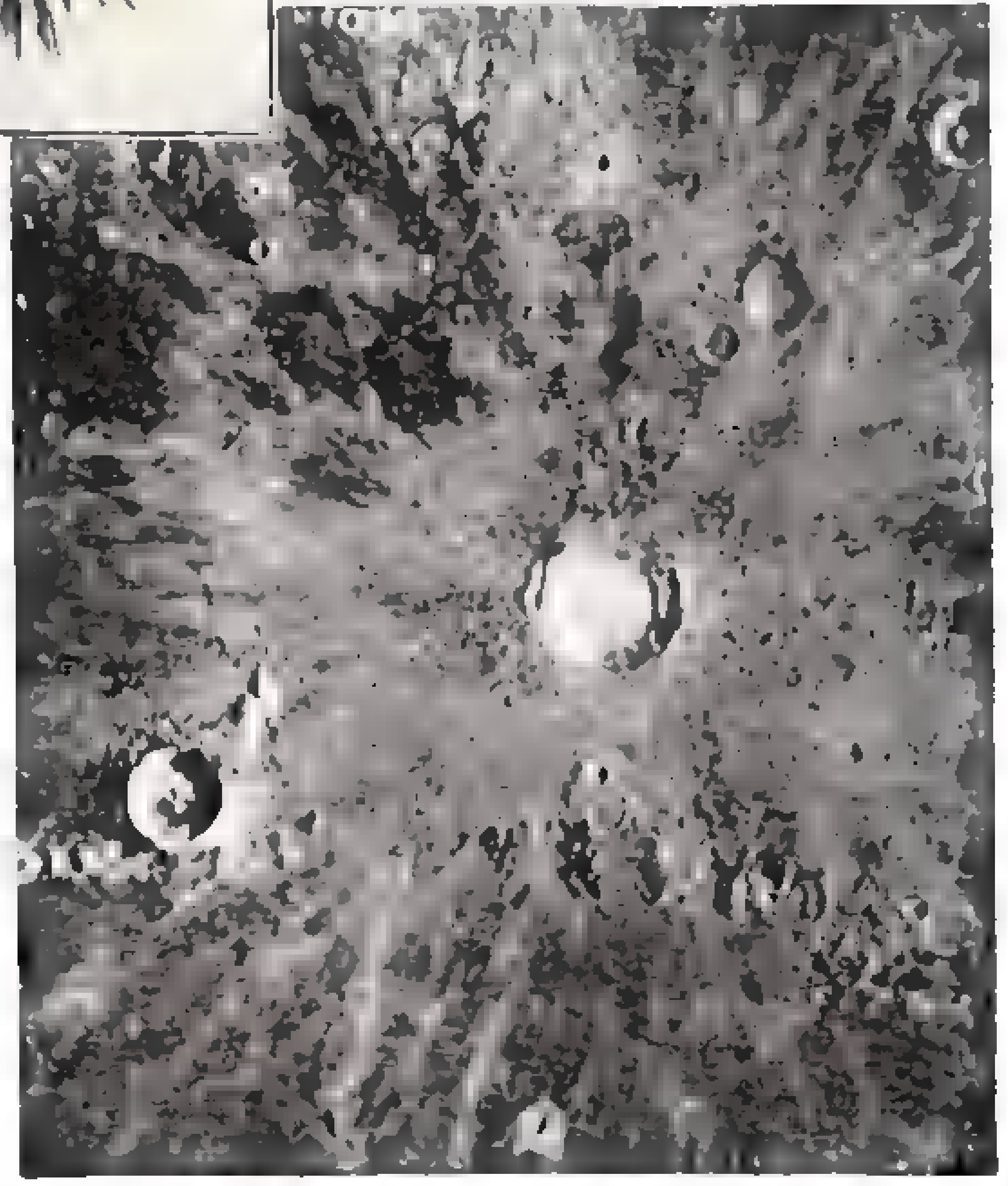




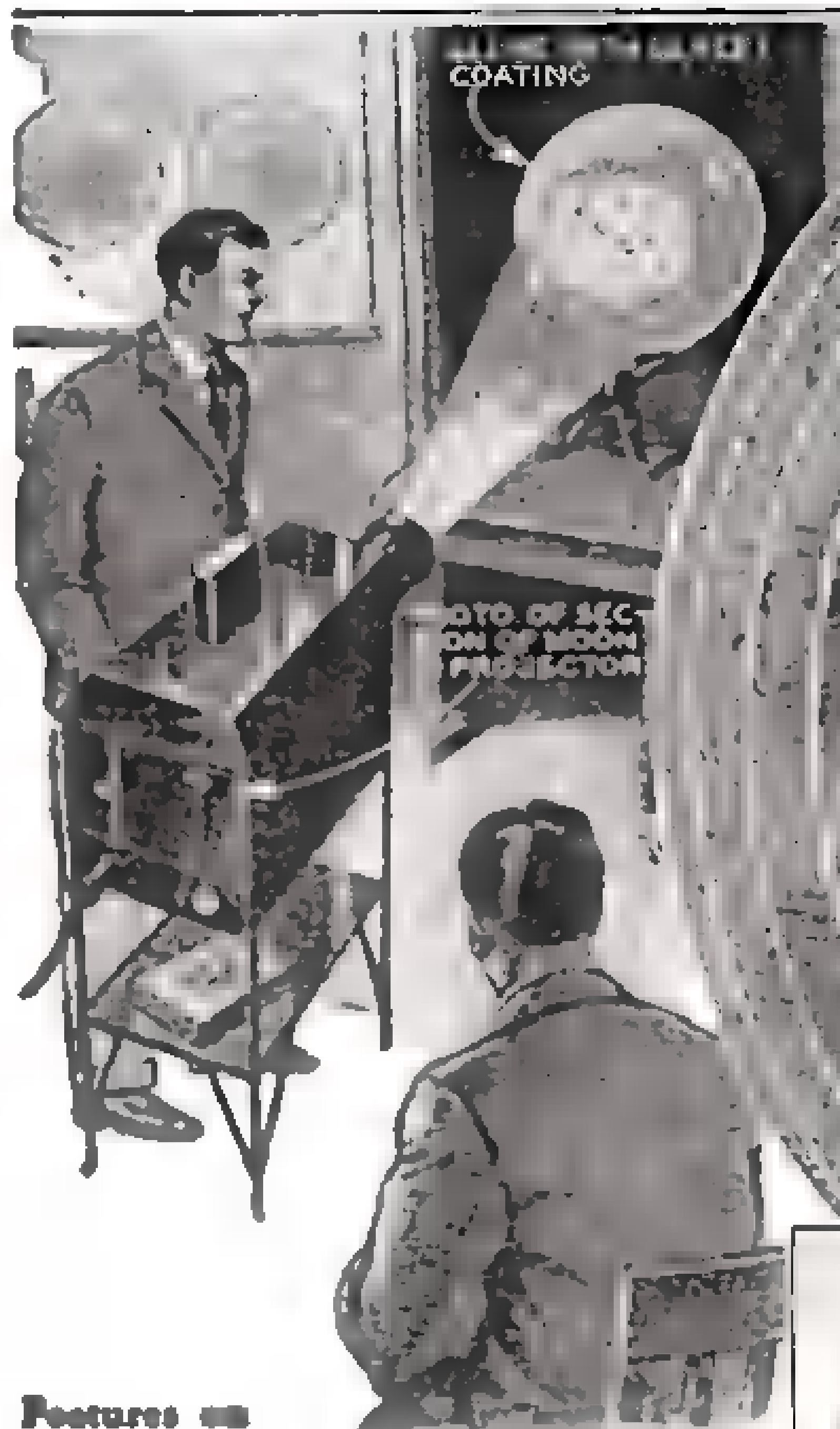
Some astronomers believe that giant lunar craters were created by terrific impact of meteorites striking the surface, digging huge pits, as illustrated here.



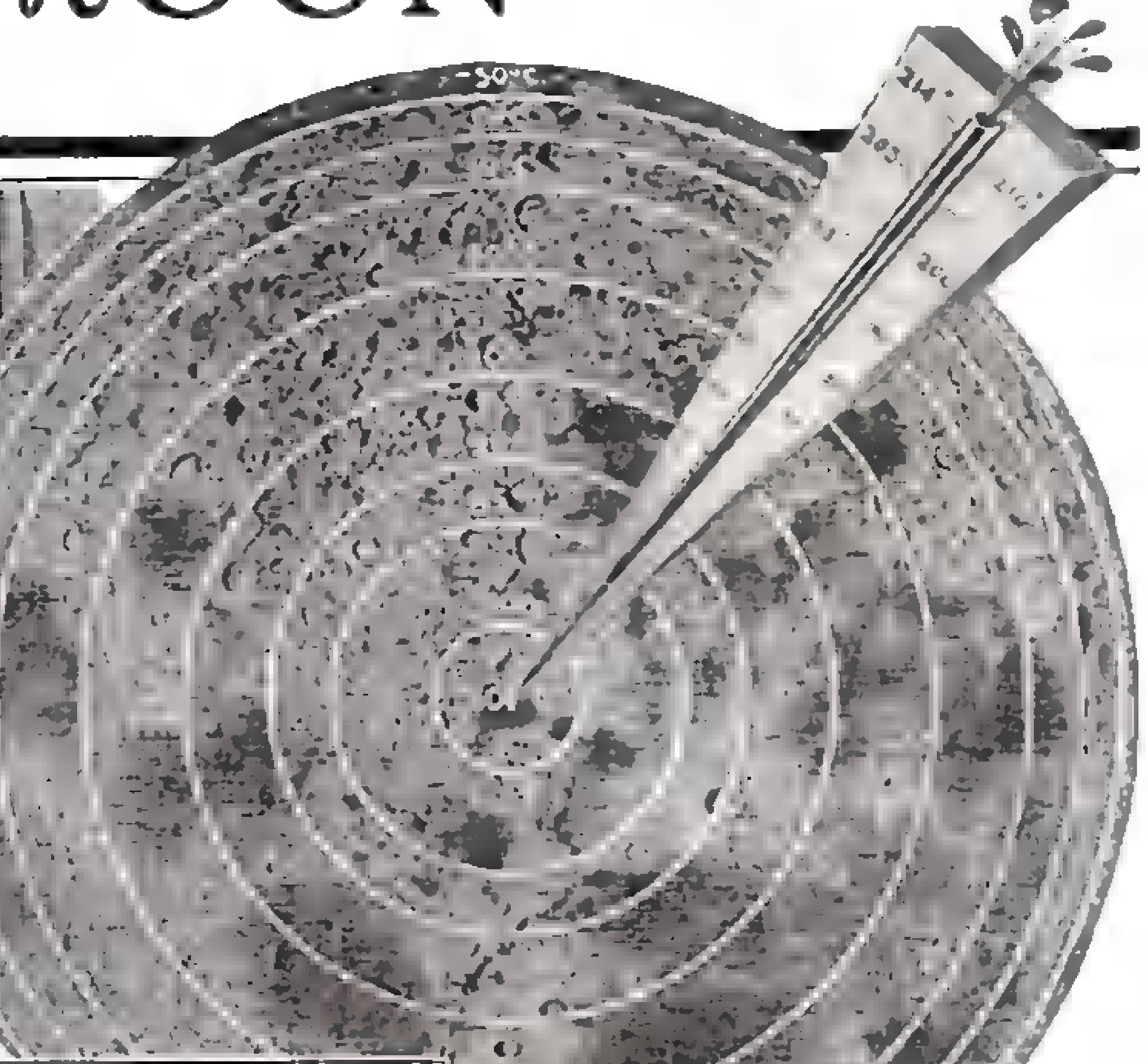
Moon's diameter, 2,160 miles, may be vividly perceived by this comparison of lunar area with area of Texas. Right is seen a sea urchin, inhabitant of Red Sea, which spawns only when moon is full. Scientists are now trying to determine whether moon is responsible for this periodicity of reproduction.



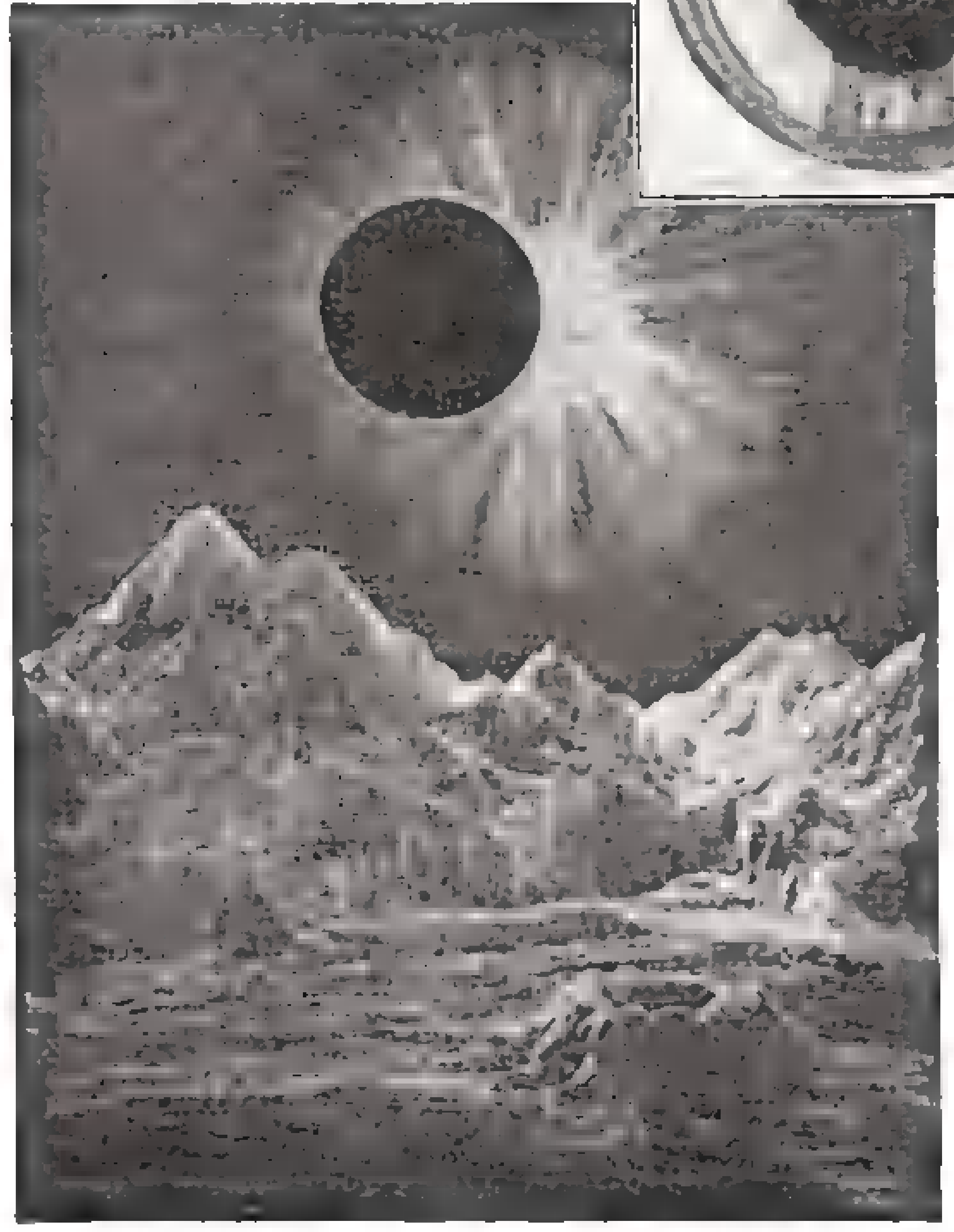
Lines radiating from these craters, scientists believe, are streaks of molten rock that splashed out when monster meteorites collided with the moon. Entire surface of moon is spotted with these exceptionally large craters, similar to one in Winslow, Arizona.



Features on moon's surface appear in true perspective when section photo is projected on globe.



When sun's rays strike vertically on moon's surface, temperatures immediately beneath and at edge of illuminated area vary to extent illustrated here. With no sunlight, thermometer drops to —240 F. At left is supersensitive thermocouple which measures stellar temperatures.



This remarkable drawing shows you just how an eclipse of the earth would appear to an inhabitant of the moon.

IT IS unwise to dogmatize about the future, and hence a cautious man of science would hardly make the positive assertion that human beings will never visit the moon, though the difficulties involved in such a journey now appear insuperable.

On the other hand it is quite safe to assert that, without leaving his own planet, man will learn much more about the earth's satellite in days to come than he knows today. This expectation is based upon the remarkable progress accomplished in the study of the moon in recent years.

Here are a few achievements that would have seemed utterly and forever impossible to astronomers of a century ago:

It has long been realized that the lunar surface must get intensely hot during the long lunar day and intensely cold during the long lunar night, as the moon has no atmosphere—or none to speak of—to temper and conserve the heat of the sun's rays. Science could only speculate, however, about lunar temperatures until a recently invented instrument, the vacuum thermocouple, was attached to the big 100-inch telescope at Mount Wilson Observatory and applied to the actual measurement of these temperatures from point to point on the surface of the moon.

These measurements show that wherever the sun's rays fall vertically upon the moon the surface becomes a little hotter than boiling water, while at the edge of the illuminated area the surface is nearly as cold as liquid air. When the solar rays are withdrawn during the lunar night, which is half a month long, the surface gets colder and colder until its temperature is probably as low as 240 degrees below zero Fahrenheit.

A range of about 450 degrees between midday and midnight is one of the reasons why human visits to the moon are apparently impossible!

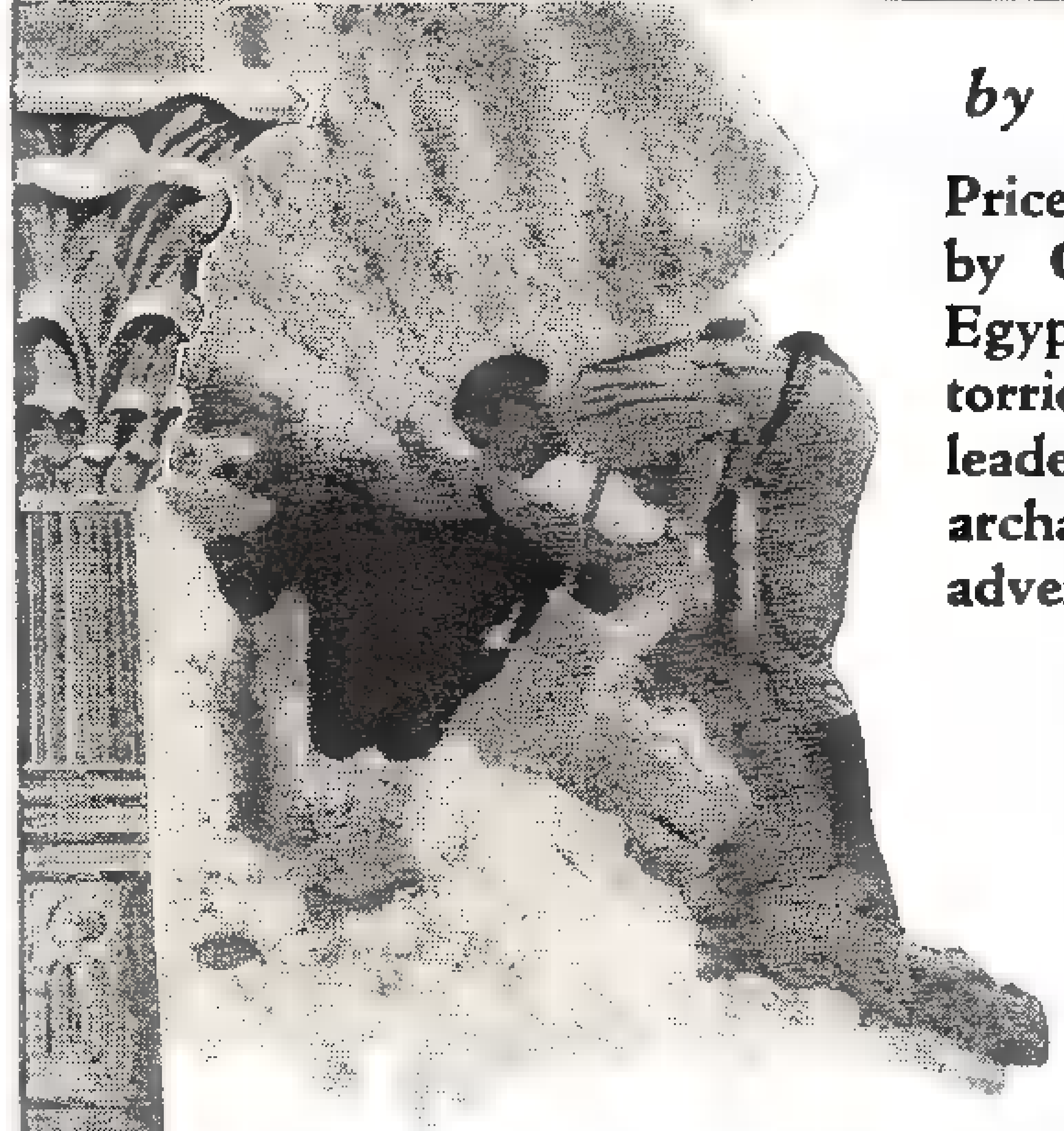
Though bygone astronomers did not believe the moon to be made of green cheese, they did not know, as we do today, that the surface material must consist mainly of some material similar to volcanic ash or pumice. This has been proved by Prof.

(Continued on page 22)

FINDING CLEOPATRA'S FABLED EMERALDS

by COUNT BYRON de PROROK

Priceless jewels worn twenty centuries ago by Cleopatra, vampire queen of ancient Egypt, have at last been found deep in the torrid, sandy wastes of the Sahara. Here the leader of the intrepid expedition, famous archaeological explorer, tells of the amazing adventures he met with on the perilous quest.



Count de Prorok peering into subterranean chamber, unvisited for [illegible] centuries, in which he discovered priceless emeralds of Cleopatra.

FOR twenty centuries amazing tales of the legendary emeralds of Cleopatra, supposed to be buried somewhere in the desert sands, have intrigued the imaginations of adventurers, sent them wandering over burning deserts, lured by the quest of fabled jewels once worn by the most romantic woman of all history — jewels which Antony may have given her, which she may have worn in those fabled scenes of history that have come down to us as the most glamorous of legends.

This much was fable, but was there any basis to the legend? In years of exploration in desert regions, I had heard this whispered tale a thousand times, hardly daring to believe, or to hope that I might find them.

But I have!

In a mysterious cavern on the heights outside the desolate city of Garama I came to the end of my long hazardous quest for the hidden jewels. There after two years of scouring the torrid desert, I ended an adventure that had included skirmishes with wild desert tribesmen, tortuous treks over thousands of miles of sandy wastes, and discoveries of cities long lost to civilization.

While the expedition worked among the ruins of the old Garamante city, I explored the neighboring territory, and came upon the dark mouth of a cave which, my guide pointed out, held the possibility of containing the long-lost gems. Ancient symbols carved on the rocks gave me the first token of my quarry.

Torch in hand I crawled into the narrow opening, and after moving forward [illegible] few yards, found I could stand upright. About me lay a strange breath-taking scene. The flickering light of my torch threw grotesque shadows on the walls, revealing rows of ancient hieroglyphics.

In the dim light I stumbled upon the remains of old household utensils and implements of war—swords, arrows, spears. Down in the midst of these objects I spied [illegible] dust-encrusted bundle wrapped in a winding sheet. I prodded it with my stick and it fell open—rotten with age. But as I thrust about seeking to determine its contents, an amazing scene greeted my eyes. There among some bits of broken pottery lay the object of my quest—a handful of deep-green stones. It is difficult to describe my joy as I examined these relics of antiquity and realized that I was holding ornaments that once bedecked the person of the famous vampire queen of Egypt.

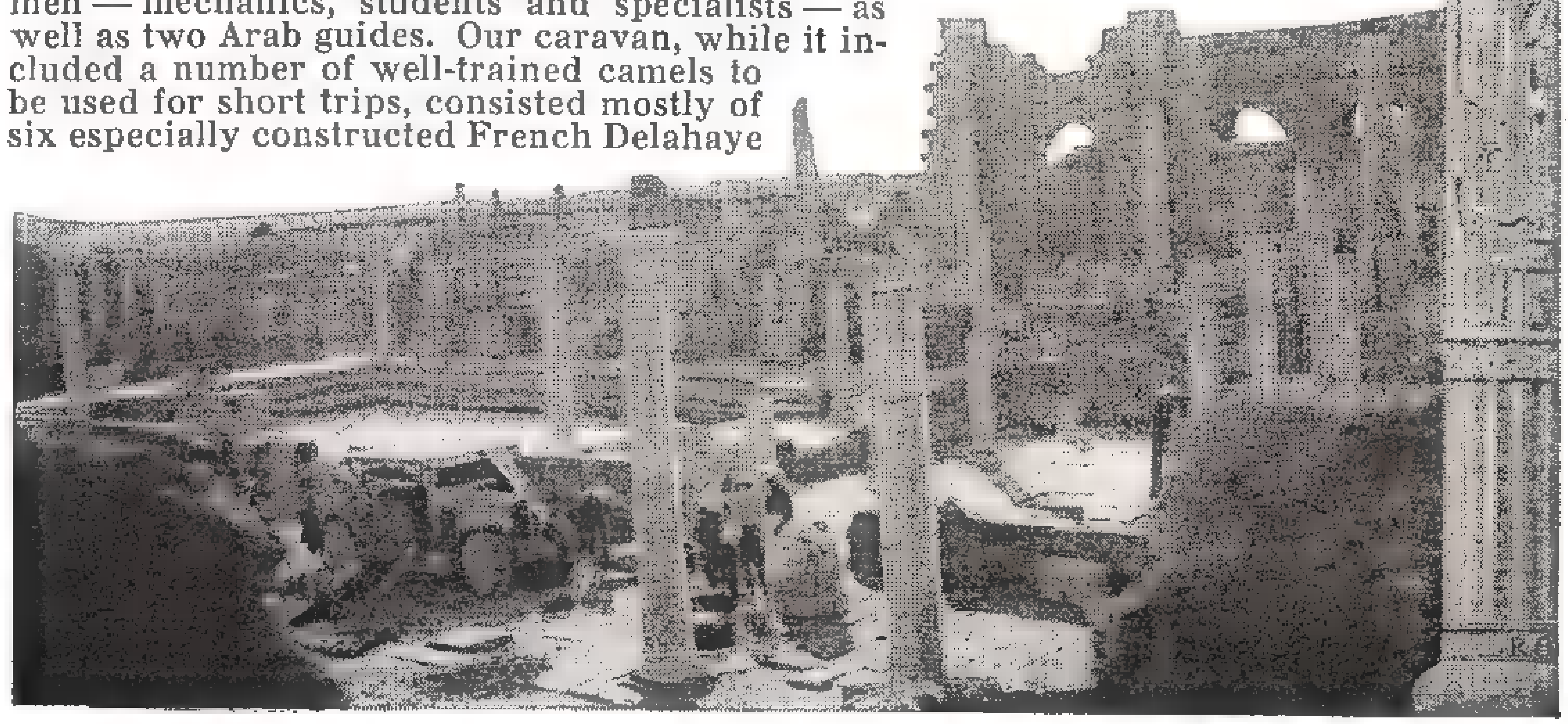
To make sure that I had found the gems I was seeking, I compared them with several emeralds I was carrying that I had taken a few years previously from a beautiful necklace I dug out of the ruins of Cleopatra's summer palace at Merza Matruh, where she and Antony had spent their last hours together. The Merza Matruh stones were of the same quality of the ones I had just found, so I knew I had found the long-sought emeralds.

How my expedition, made under the auspices of the Italian Government, toiled over the barren wastes of Africa's Sahara, makes a thrilling story.

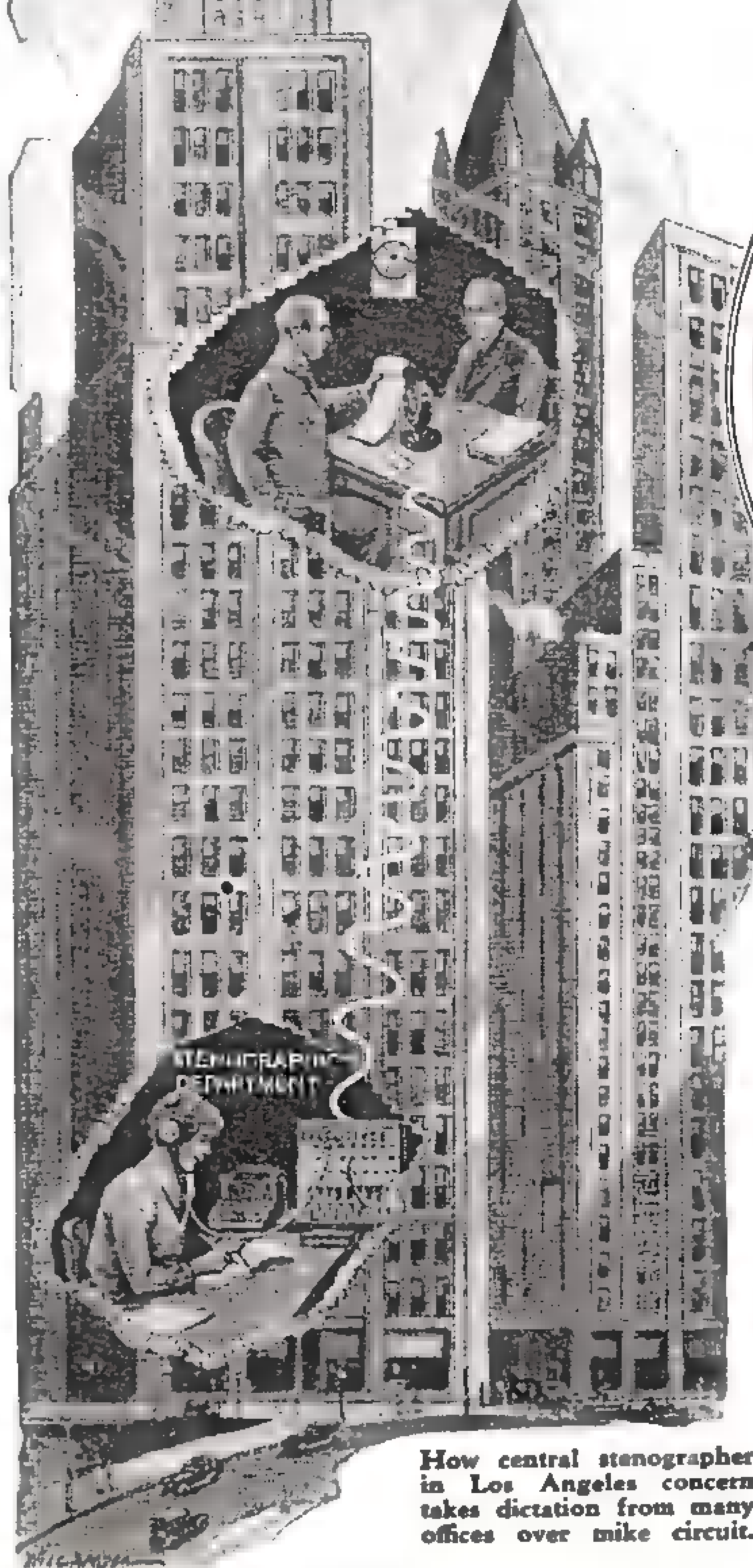
Ever since I first visited Africa I had been hearing weird stories about the mysterious emeralds of Cleopatra, reputed to be of fabulous value, from divers historical and native sources. It appeared that most of these stories, originally told by the ancient Egyptian, Roman and Cathaginian nobles, were still being told in the city of Ghat, far South in the desert, once the great slave center of the Sahara.

With Premier Mussolini's personal permission I was able to lead the first scientific expedition across the newly conquered Italian Libya to this legendary city of Ghat. Our personnel was composed of 18 men, including ten moving picture men — mechanics, students and specialists — as well as two Arab guides. Our caravan, while it included a number of well-trained camels to be used for short trips, consisted mostly of six especially constructed French Delahaye

Count de Prorok on his favorite camel on which he explored the mysterious regions of the Libyan desert. Below—the Prorok expedition camps in the ruins of Leptis Magna, a city founded centuries ago by the great Emperor Septimius Severus. The explorers are enjoying that [illegible] luxury of the desert—a bath and [illegible] shave.



SCIENCE Finds Amazing New Uses for Microphones



How central stenographer in Los Angeles concern takes dictation from many offices over mike circuit.

Broadcast technique of singers is greatly improved by small auxiliary microphones placed over nose sinus and chest. It is unnecessary to "hug" the mike during performance.

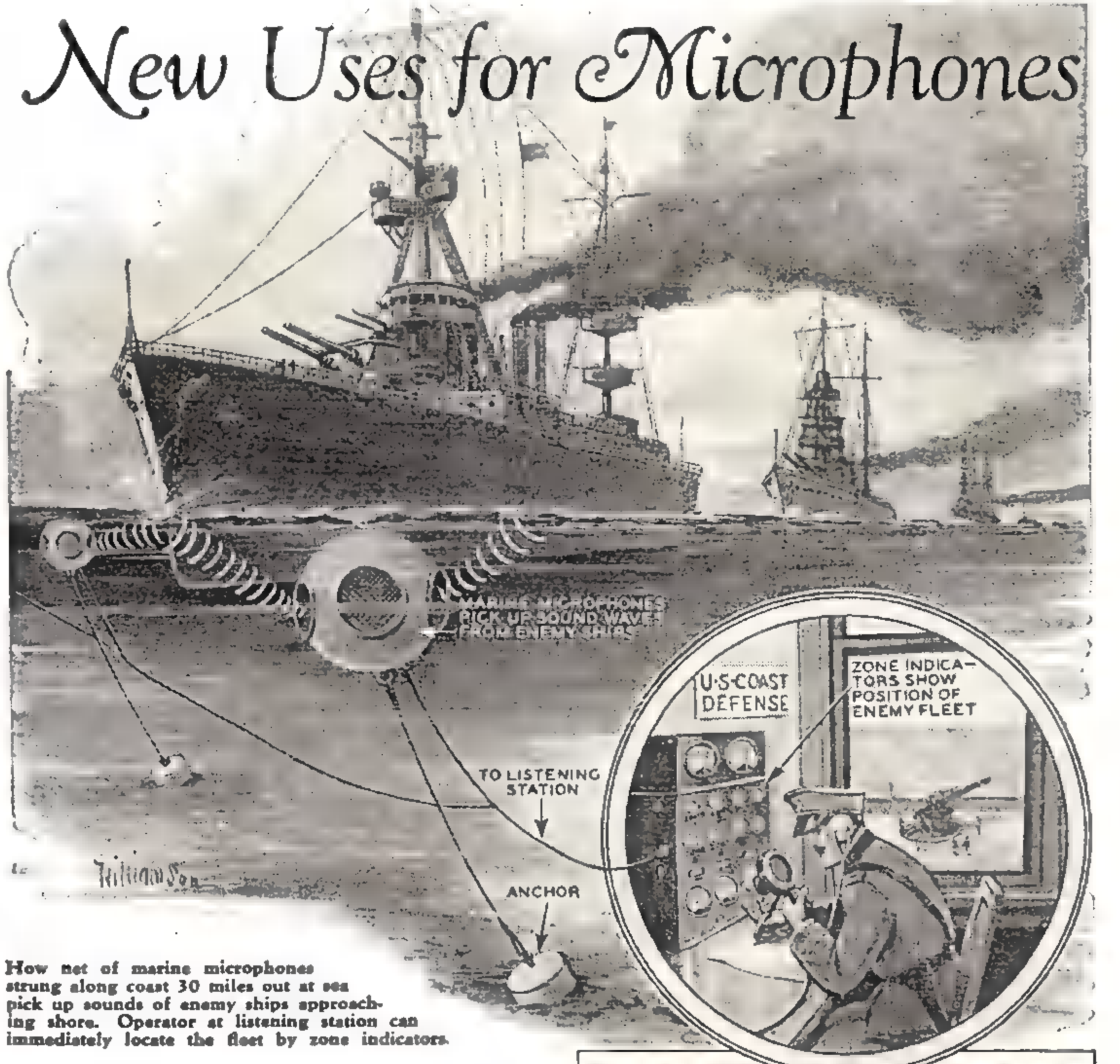
At the stenographic end of the microphone circuit over which letters, contracts, etc., are received from offices. When office door opens a light flashes on the switchboard. If occupant is out the operator takes the message.

Once merely a device for transmitting conversations, the microphone has grown today to an instrument of the most diverse uses. Read here how this amazingly simple, yet amazingly sensitive, electric "ear" can guard our coasts from surprise naval attacks, how it warns of perilous pressures at mighty dams—and how it serves with equal efficiency the surgeon and auto mechanic.

PERHAPS the most amazing evolutionary progress of modern days, as differentiated from purely inventive progress, has been in the field of the microphone. So much so is this the case, that it might almost be said we are living in the age of the microphone.

Far afield has the microphone gone from merely translating human voice into electrical impulses and back to voice again. In the vitals of mighty dams in the Rocky Mountains, imbedded microphones keep the observers in watch-towers constantly in touch with conditions down deep in the masonry. Earth slides under, or at the sides of, dams are heard in the microphones long before they become dangerous.

Excessive pressures of water against the masonry cause significant sounds in the microphone circuits. When the dam caretakers hear these sounds they press buttons which open spill-ways to evacuate water until safe pressure limits are reached.

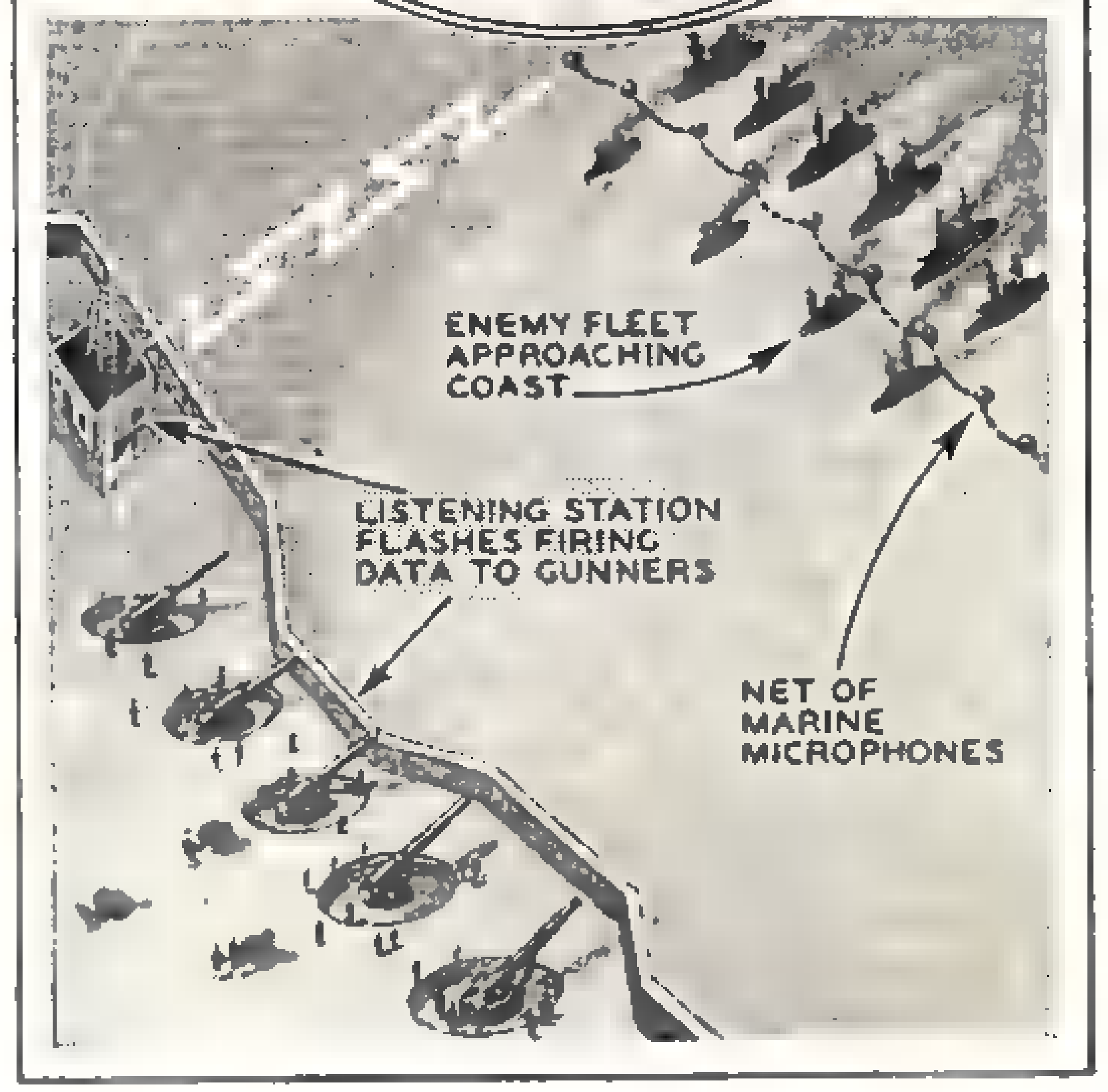

MARINE MICROPHONES PICK UP SOUND WAVES FROM ENEMY SHIPS
U·S·COAST DEFENSE
ZONE INDICATORS SHOW POSITION OF ENEMY FLEET
TO LISTENING STATION
ANCHOR
Williamson

How net of marine microphones strung along coast 30 miles out at sea pick up sounds of enemy ships approaching shore. Operator at listening station can immediately locate the fleet by zone indicators.

In the surgical wards of a great hospital, surgeons and nurses bend tensely over an abdominal operation. Instead of the measured voice of the nurse calling off the condition of the heart, often distracting the attention of the chief surgeon, a pulse of low, soft sound spreads through the whole room. It is the sound of the heart itself, beating over a microphonic circuit.

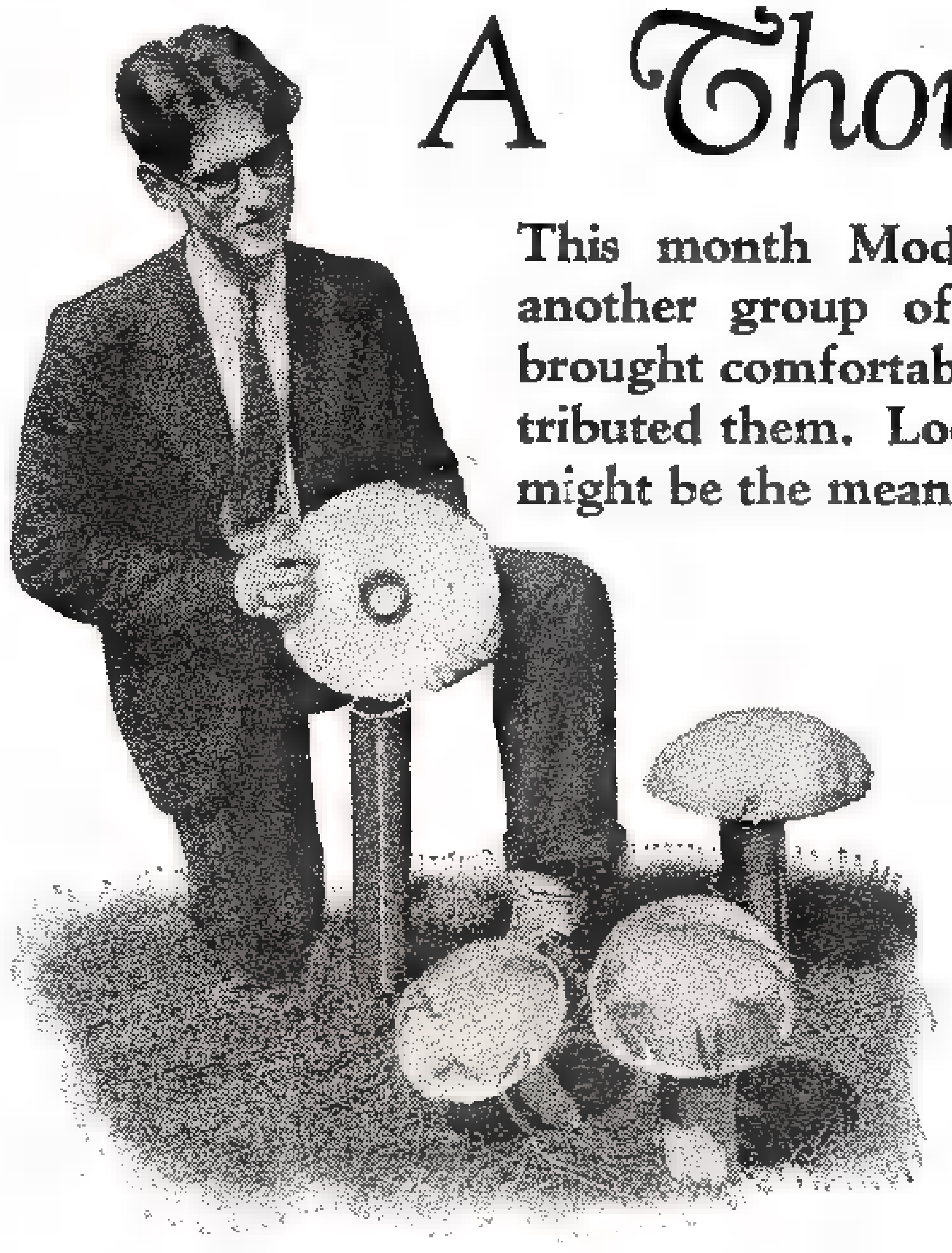
If it slows dangerously, or otherwise weakens, the surgeon takes appropriate steps to restore it to normal. Thus he is not suddenly obliged to stop his careful work at a dangerous point. Instinctively, he listens to the beat as he proceeds with his work, guiding his work according to the heart's condition. The sound of the heart could be amplified until it churned with the roar of Niagara. This, however, is never done, unless by internes or scientists experimenting with healthy persons.

Indeed, the day is not far distant when the doctor will entirely dispense with his stethoscope, so long the badge of the medical profession, and simply place a microphone over the patient's heart and listen


ENEMY FLEET APPROACHING COAST
LISTENING STATION FLASHES FIRING DATA TO GUNNERS
NET OF MARINE MICROPHONES

Picturized diagram here illustrates how enemy fleet approaching coast is located in war time. Sounds of churning propellers are picked up by the operator at listening station who immediately transmits firing data to coastal fort. Ships ▬ thus be spotted before they come in firing range.

A Thousand WAYS TO MAKE a LIVING



This month Modern Mechanix and Inventions proffers another group of tested money making ideas that have brought comfortable depression incomes to readers who contributed them. Look the items over carefully—one of them might be the means of solving your unemployment problem.

Profits in Synthetic Toadstools

Something strikingly unique in yard ornaments are the concrete toad stools which a Portland, Oregon, man makes for 15 cents and sells for 75 cents to neighbors, who are glad to purchase such a novel decoration. Making the toadstools is surprisingly easy. Into a mould made from an old chopping bowl—over the inside of which has been spread a layer of old newspapers—pour some cement, imbedding in the bottom a short length of pipe to serve as the stem. The paper forms creases in the top, while painting different shades of green and brown enhances attractiveness of the stools. They should be "planted" in the ground in groups—which will mean more orders for you.

Servicing Automobiles

Enterprising but jobless auto mechanics will find a lucrative source of income in a maintenance scheme being worked by a New York ex-garage man. The plan requires no shop—you call at the auto owner's garage and service his car four times a month. On the first call, you check the ignition; on the second, check brakes and steering; on following calls you grease and tighten up. In short, you keep the car in perfect condition.

Giving each car an hour's work you can service eight cars a day, totaling 48 cars each week and paying you at least $200 a month. A few hundred circulars explaining your services will help to bring you the 48 customers. It will pay you to employ a helper to clean interior, windows, dust body, etc., gratis.

Sharpening Razor Blades

An inexpensive razor blade sharpener was the nucleus of a lucrative repeat business worked up by an ex-soldier in Creston, Iowa. At first he set a price of a cent a blade, and sharpened them right at the house. Later he purchased wholesale a large number of wine glasses which he left with the customers so they might have a receptacle in which to deposit the dull blades until he returned, thereby increasing business a great deal. Eventually he started a mail order sharpening service in addition, which kept him busy far into the night. Now he has a comfortable living from a long list of satisfied customers.

Income for Radio Fans

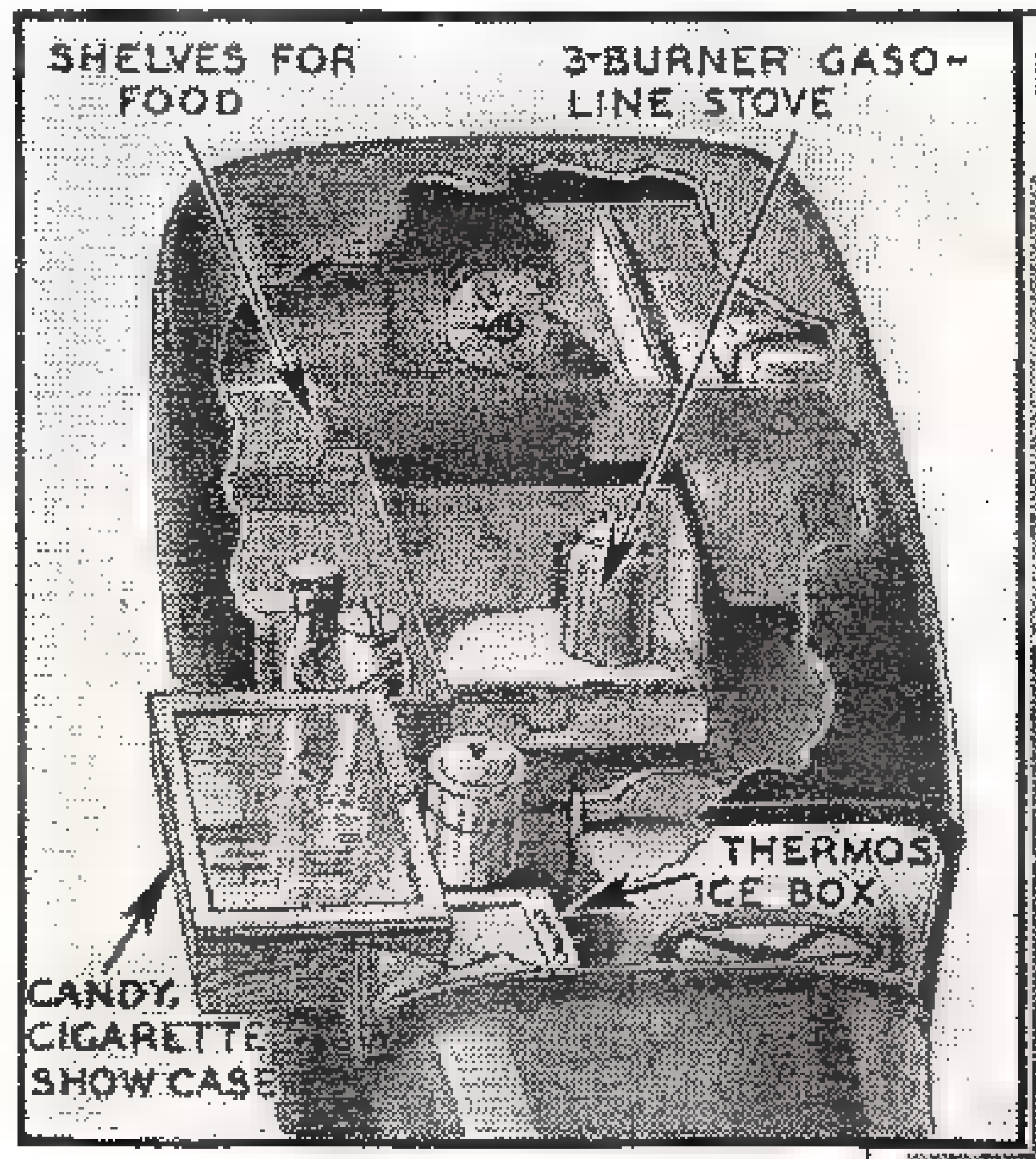
A radio fan living in Atlanta, Ga., capitalized upon his hobby and now earns a comfortable income selling old radio parts to fellow fans who "build their own" sets. Visiting all the radio shops in town, he found that each had one to two dozen obsolete "trade-in" battery sets which they were glad to get rid of for as little as 50 to 75 cents each. Next, in his radio work shop, he dismantled each set, salvaged all the useful parts, then had a radio repair man test them to determine their values. An ad inserted in a local paper to the effect that used radio parts were for sale at a fraction of their regular prices brought $5 profit the first day. Advertising in papers in surrounding small towns brought his income up to $50 a week.

Money in Bleaching Water

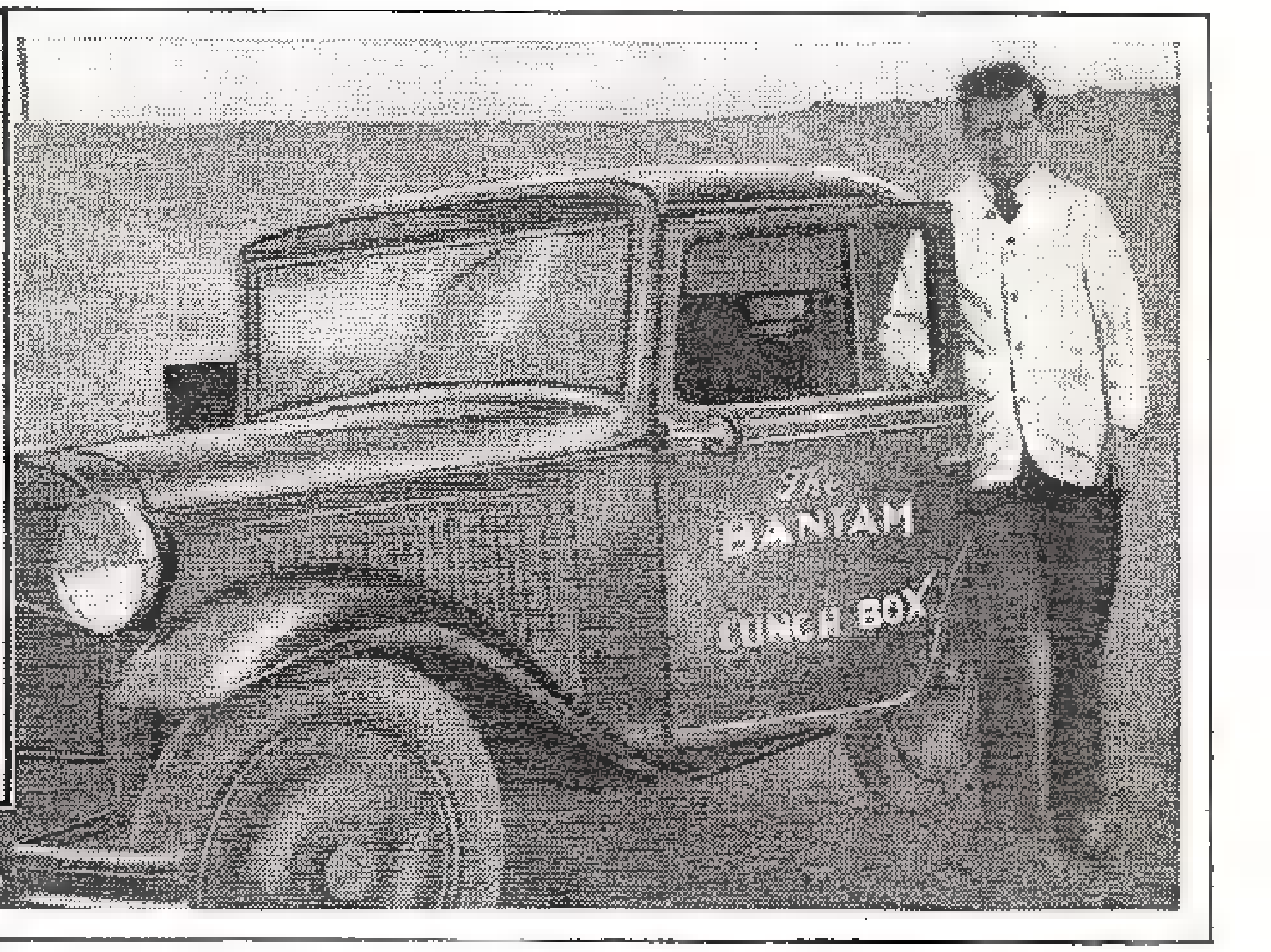
Forty dollars per week is the average income of a New York city man who manufactures a bleaching water for clothes. His product is manufactured at home from a formula he found in Henley's 20th Century book of Formulas and Recipes, and sells for 30 cents a gallon. Housewives found his product so satisfactory that he has been able to build up a regular route. He earns now more than he did during boom time, and is thankful he got laid off.

Bantam Lunch Boxes

Selling "bantam lunch boxes" to workers in factories, on construction jobs, and in offices remote from a convenient lunch room brings Edwin Delvin, of Springfield, Mass., a profit of $35 to $50 weekly. He gets around to his customers in his Austin business coupe which he has converted into a veritable rolling restaurant. His equipment, occupying all space but the driver's seat, consists of a small 3-burner gasoline stove built across the rear inside, a small thermos ice box at the front, and sufficient shelves at sides and top to carry such edibles as bread, cheese, hot dogs, etc., as well as cooking and eating utensils. A small show case across the window sill displays cigarettes, candy, etc., at standard prices.



Artist's drawing above shows construction of the various compartments of the Bantam lunch box.



Polishing Auto Headlights

Cleaning and polishing headlights of autos belonging to business men, store managers, shop and factory workers contacted during the dinner hour is the ingenious scheme employed by an Oakland, California, man to rake in depression shekels. Few inexpensive materials needed are denatured alcohol, a dime's worth of lamp black and some cotton. Mixture of alcohol and lamp black is rubbed on the glass lenses and reflectors and when dry is rubbed off clean with a piece of cotton, leaving a brilliant polish. You can carry a can of metal polish to take care of rust or deep tarnish. A charge of 25 cents per job satisfies your customer and brings you a sizeable profit.

Keeping Up Vacant Houses

A Seattle, Washington, university student, faced with the possibility of having to quit school for lack of finances, has convinced owners of vacant homes for rent that a well-cared-for appearance is as much a psychological aid in affecting rentals as it is in selling one's own services. He found, after contacting a number of owners, that they were invariably willing to pay him for keeping up the grounds. He bought a second-hand car and necessary tools, and each evening after classes and all day Saturday he mows lawns and trims hedges, visiting each house on his list once a week.

Money-making Ad Stunt

Thirty-five dollars a week is the profit netted by an enterprising Kentucky man from a novel advertising stunt he devised. Here's how you can work it. Find out if there is on the statute books in your state a law requiring hotels to have posted in each room the law governing hotel operation. If this is the case, secure permission from local hotel owners to have some 8x12 in. cards printed with the law set forth in the middle. On the sides of the cards rule off about 20 spaces for advertising and sell them at $2 to $3 each to local merchants. When you've covered your town on this stunt, try your neighboring villages.

Gather Up Pine Cones

If you live in a region where pine trees grow abundantly you've no doubt noticed hundreds of pine cones lying around on the ground in the wooded regions. If you gather up these cones you can sell them to almost any forestry station for one to three dollars a bushel. It's advisable first to contact your forest ranger station to get prices. A good days work, with prices fair, should bring you an income of five to eight dollars.

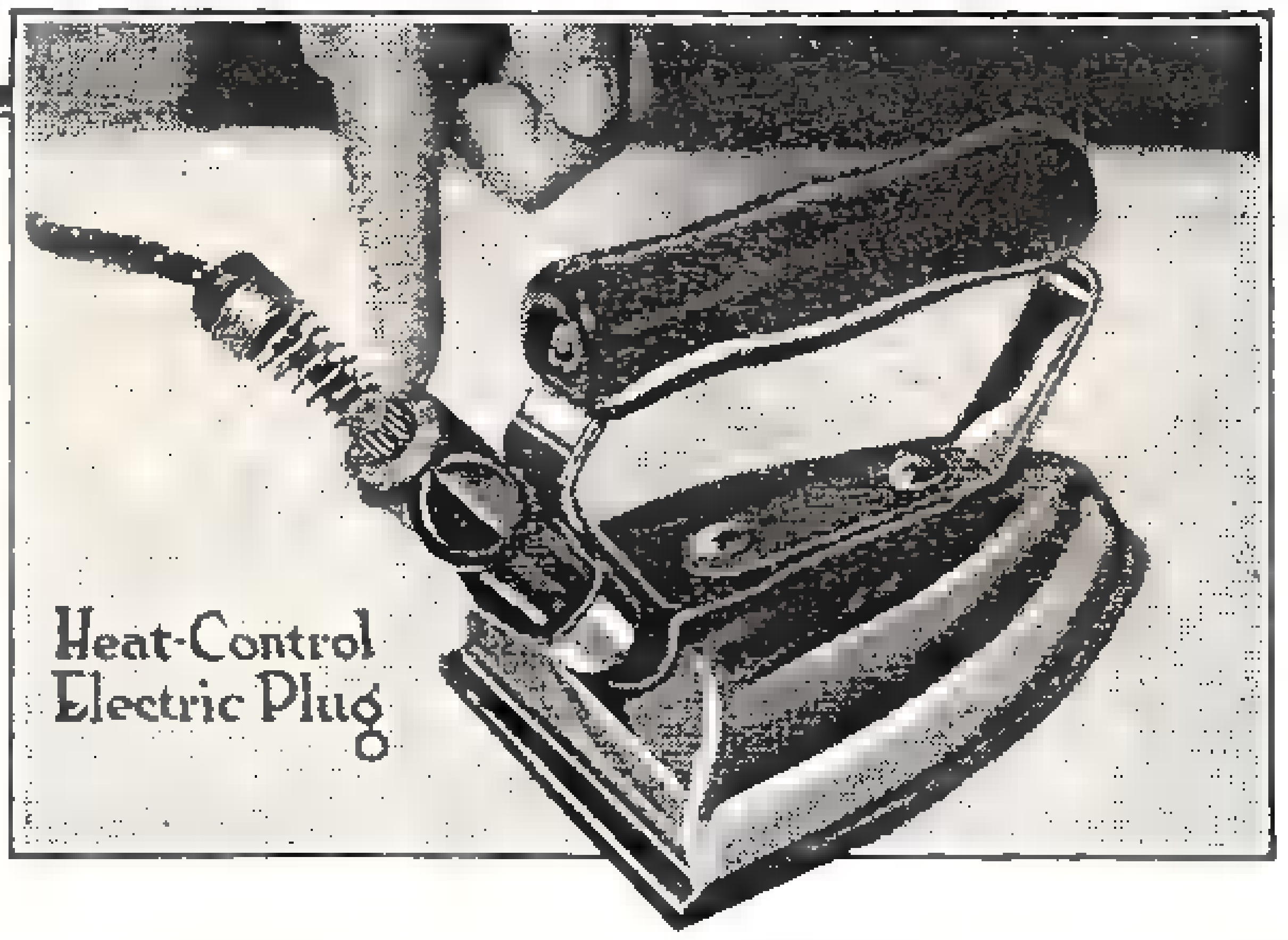
Glass Signs for Offices

Making and selling glass signs to dentists, doctors, stores, offices, etc., will bring you in a heaping handful of extra dollars. Signs most easily sold bear business names or house addresses and are about 3"x9" in size, $1.50 being a fair price. Signs of larger size can be disposed of at prices up to $5. An accompanying drawing shows how these signs are made. If you are not familiar with lettering, secure a book on the subject from the library. Lettering is made from tin foil cut out with a razor blade and pasted on with transparent glue. The bevel-

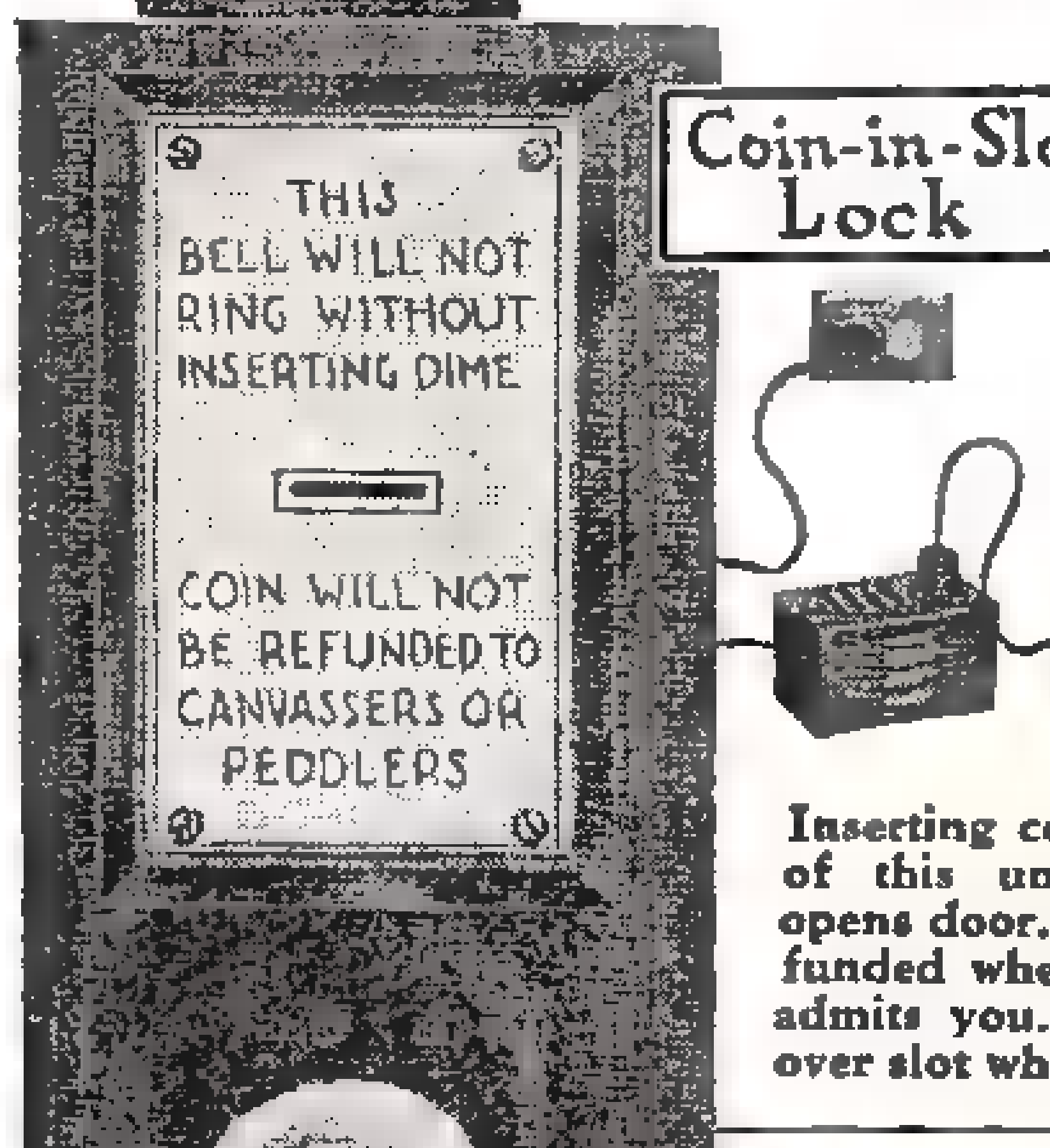
Mechanical Aids Make Life Easier for the HOUSEWIFE

Ultra-Violet
Health Lamp

You [illegible] convert your bridge lamp into [illegible] ultra-violet lamp with a special transformer and socket adapter now on the market. The sunbulb is inserted in a special reflector which fits lamp socket. Turn of switch floods room with health-giving rays.


Heat-Control
Electric Plug

Temperature control for electric iron, percolator, heater, etc., is provided with this plug having rheostat to govern current flow. Six degrees of heat are at absolute control of the operator.


Coin-in-Slot
Lock
THIS BELL WILL NOT RING WITHOUT INSERTING DIME
COIN WILL NOT BE REFUNDED TO CANVASSERS OR PEDDLERS

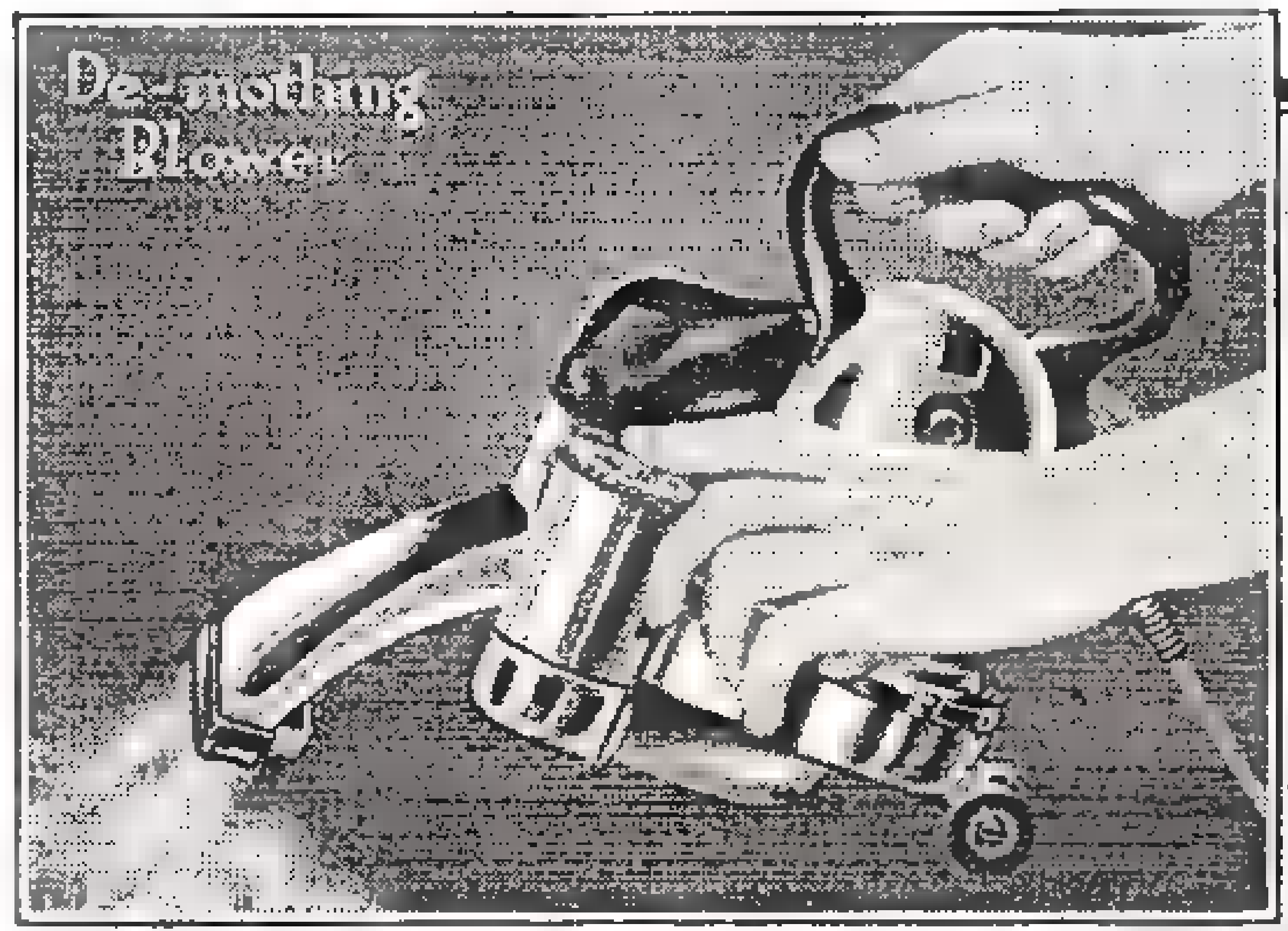
Inserting coin in slot of this unique lock opens door. Coin is refunded when housewife admits you. Plate is put over slot when you go out.

Pea and
Bean Sheller

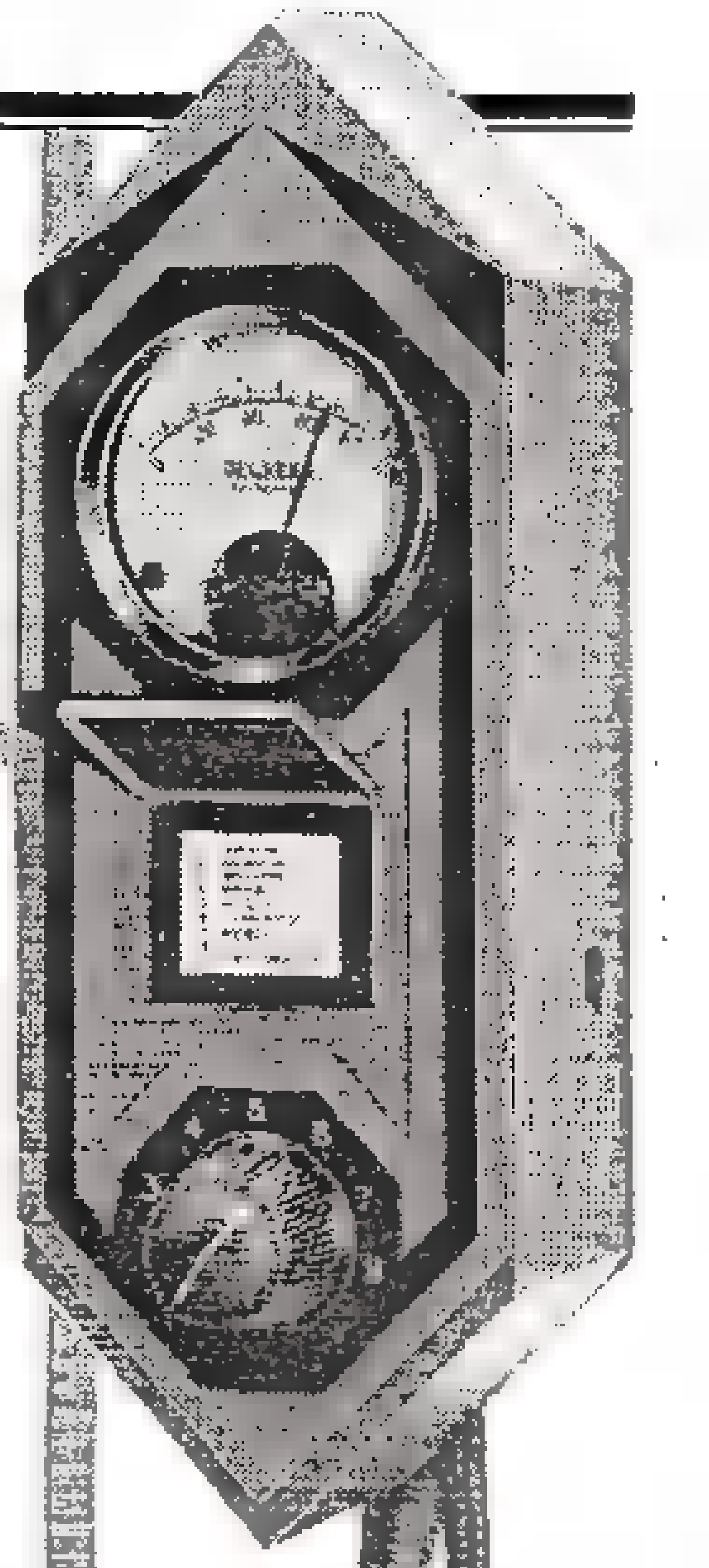
Midget
Bowling
Alley

Labor of shelling peas is reduced to absolute minimum with this automatic sheller now [illegible] market. The peas are fed into the hopper with the left hand while the crank is turned with the right. The peas [illegible] beans roll out into the dish while the empty pods drop on the other side. Clamps [illegible] table [illegible] shown, and does [illegible] clean job of removing strings and separating peas and pods.

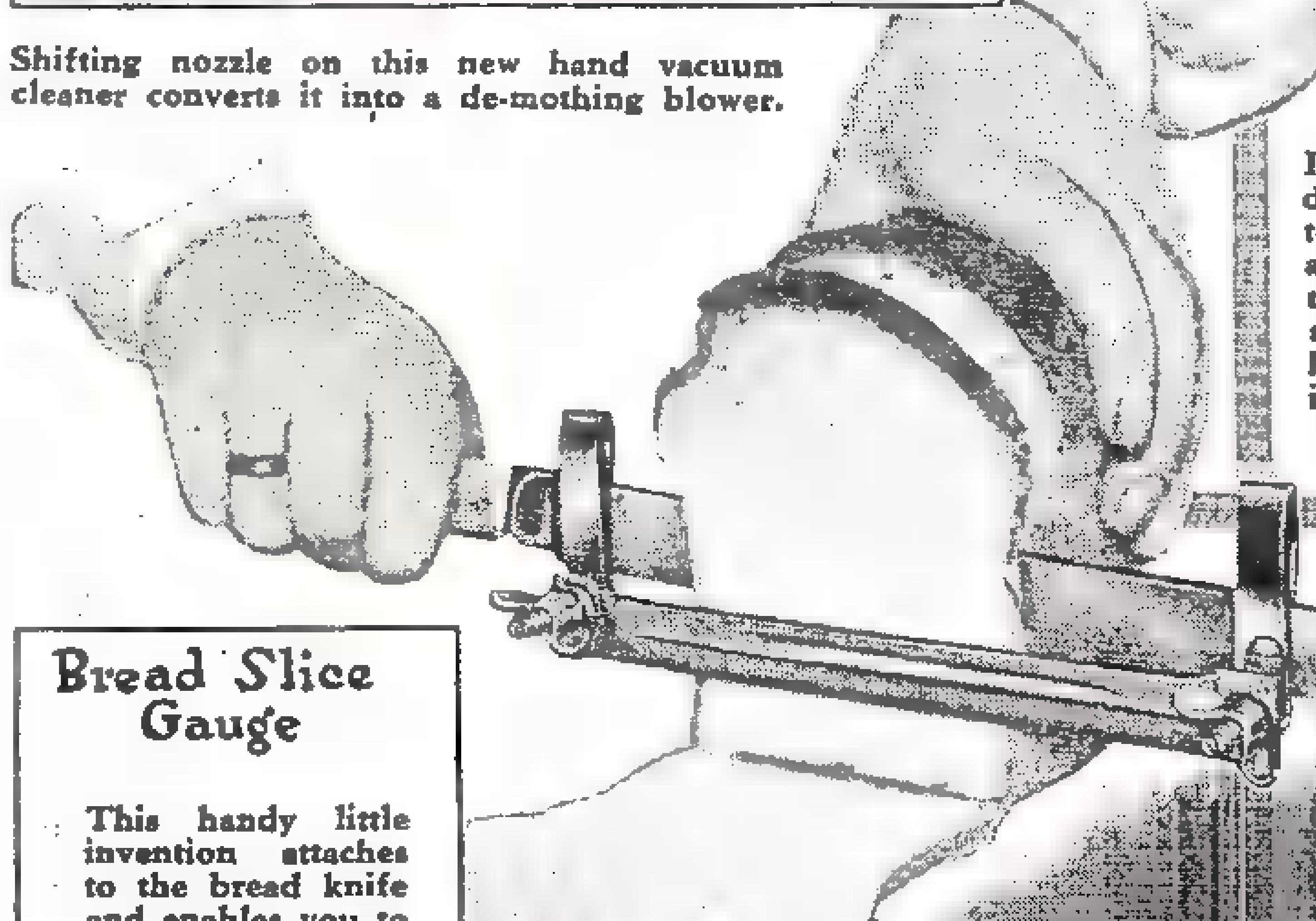
Like everything else, bowling is being deflated too. For instance look [illegible] the photo above. Here is [illegible] midget bowling alley now [illegible] the market which is lots of fun for a quiet little game at home. It's played pretty much like the regular "ten-pin" game at the big bowling alleys. Ball is slightly larger than [illegible] baseball and it rolls back to you in [illegible] groove just [illegible] in regular game.


De-mothing
Blower

Shifting nozzle on this new hand vacuum cleaner converts it into a de-mothing blower.


All-room
Temperature
Indicator

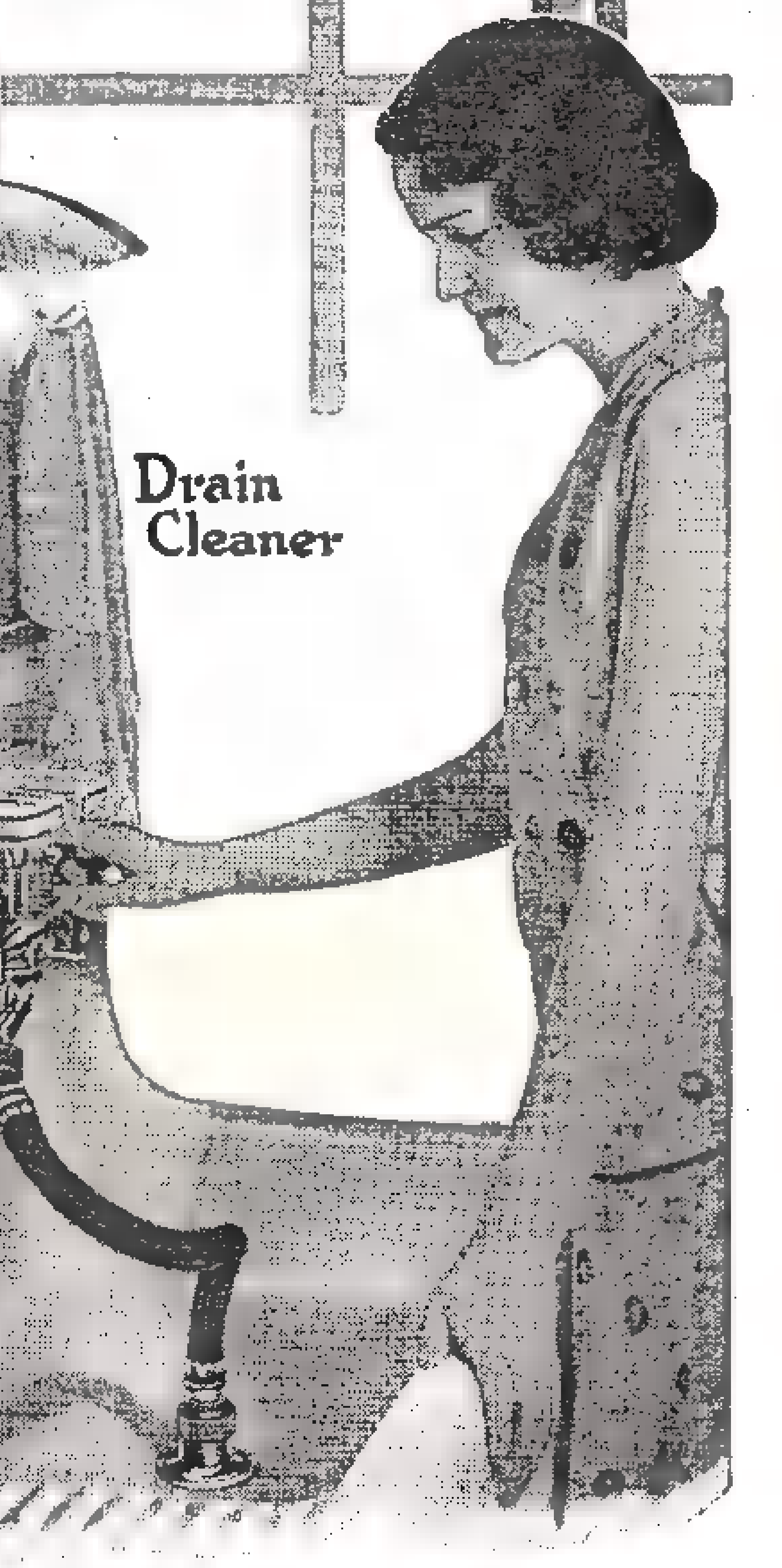
Indicator has a dial which tells temperature of any room, basement, garage, etc., by turning knob to room in question.



Bread Slice Gauge

This handy little invention attaches to the bread knife and enables you to cut even slices of bread of any desired thickness quickly and easily.

Cake
Breaker


Drain
Cleaner

By using this new cake breaker, you can divide the most delicate angel food cake into thin perfect slices without even cracking the icing. The prongs are inserted down into the cake, the breaker is twisted slightly, and presto! the piece comes away intact, without a crumb turned the wrong way. Durable prongs refuse to bend under heavy use.

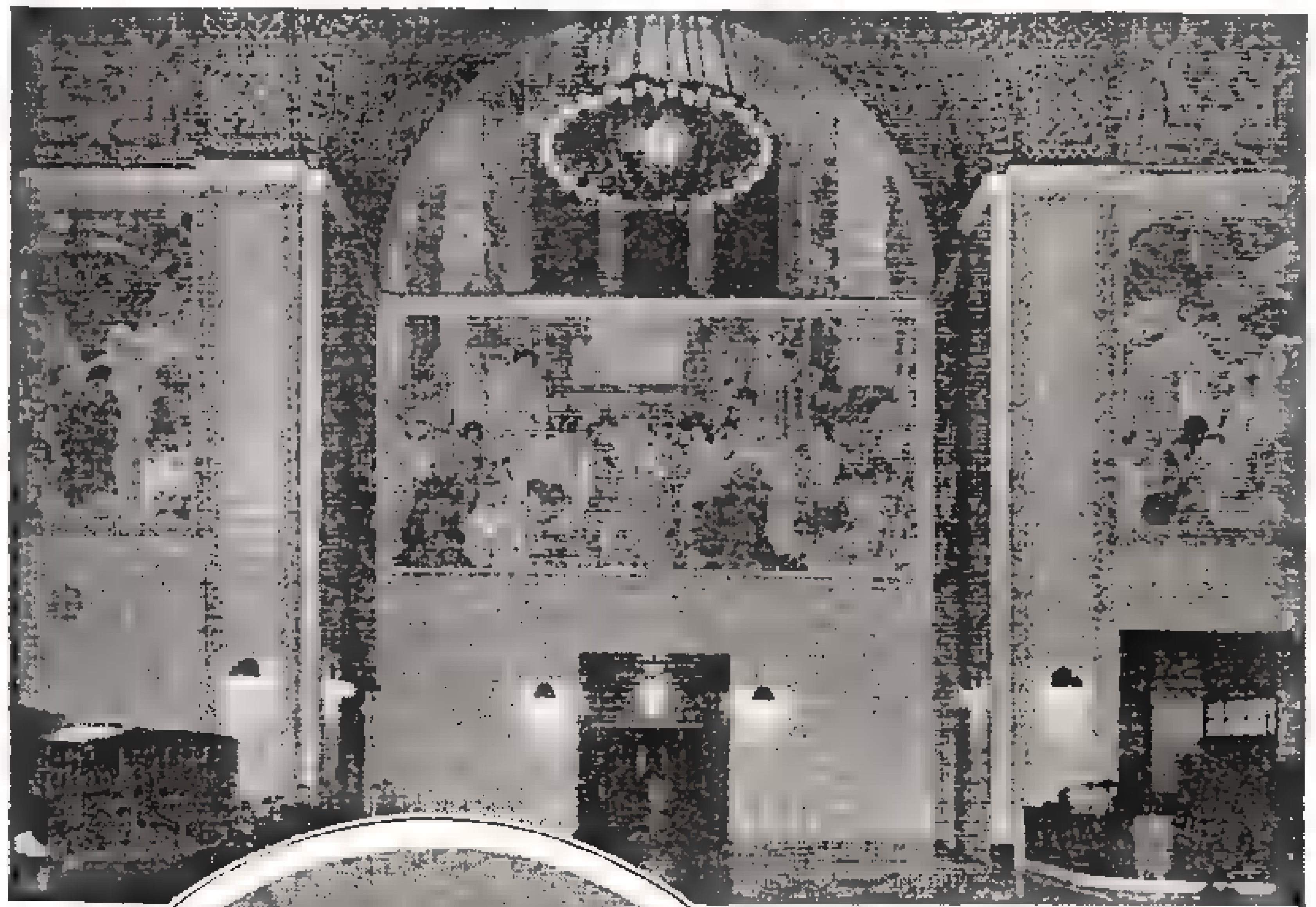
Recently made available to housewives, this drain cleaner shown above opens up clogged drains by water pressure, doing job more thoroughly than hand suction pumps, it is claimed. It comes with different attachments which permit its use in kitchen sinks, bath tubs, etc. May be attached to any type of faucet.

MECHANICS Aid Art to Create Mural Masterpieces

by

DON BLACK

It seems a far cry from mechanical engineering to the esthetic intricacies of an oil painting, but the mural masterpieces of Dean Cornwell just hung in the Los Angeles Library would have been impossible if the mechanic and artist had not worked hand in hand. Methods employed in fabricating these paintings are described here.



View of the Los Angeles Central Library lobby with the Cornwell murals in place. White lead binds them to the wall.

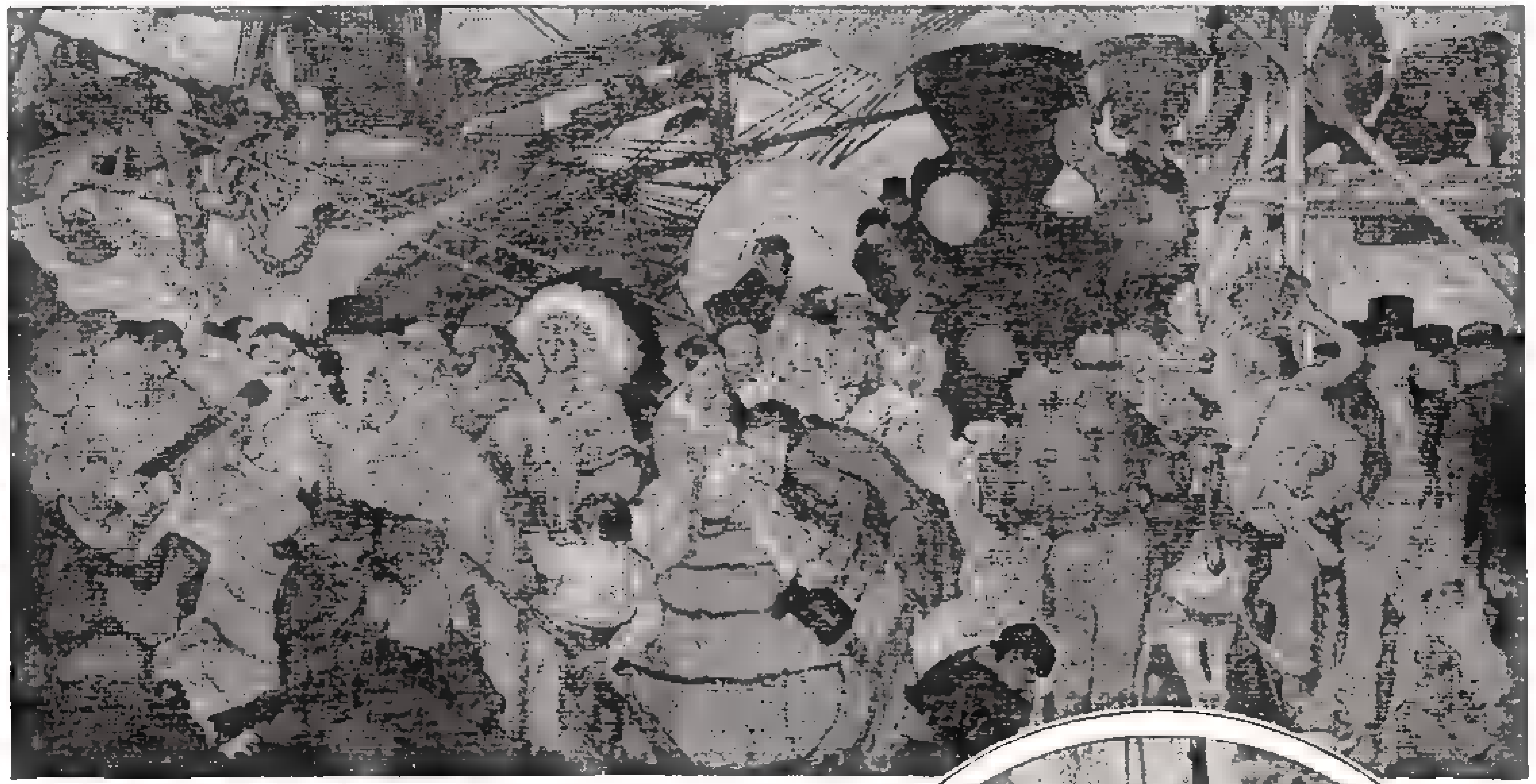
Dean Cornwell, distinguished artist, who created the mural masterpieces along unique lines. Five full years were required to plan and complete the murals, which comprise twelve paintings containing [illegible] 300 human figures.

DEAN CORNWELL, internationally famous young artist, has just completed the world's largest mural paintings. Today they hang on walls of the Los Angeles Central Library, a colorful and arresting tribute to the esthetic genius of this man and a challenge to posterity.

But of the thousands who will linger before them in awe and admiration, few will ever realize that these vivid panels depicting the early history of California are more than an artistic triumph, that the finished work represents also a distinct achievement in mechanical engineering.

For an explanation of this statement, a proper conception of the physical elements involved is essential.

In the first place, with a combined total area of 9,000 square feet, these murals dwarf in size the most ambitious efforts of previous masters. Four of the twelve paintings are 40 by 40 feet square, the lesser eight panels being 20 by 40 feet.

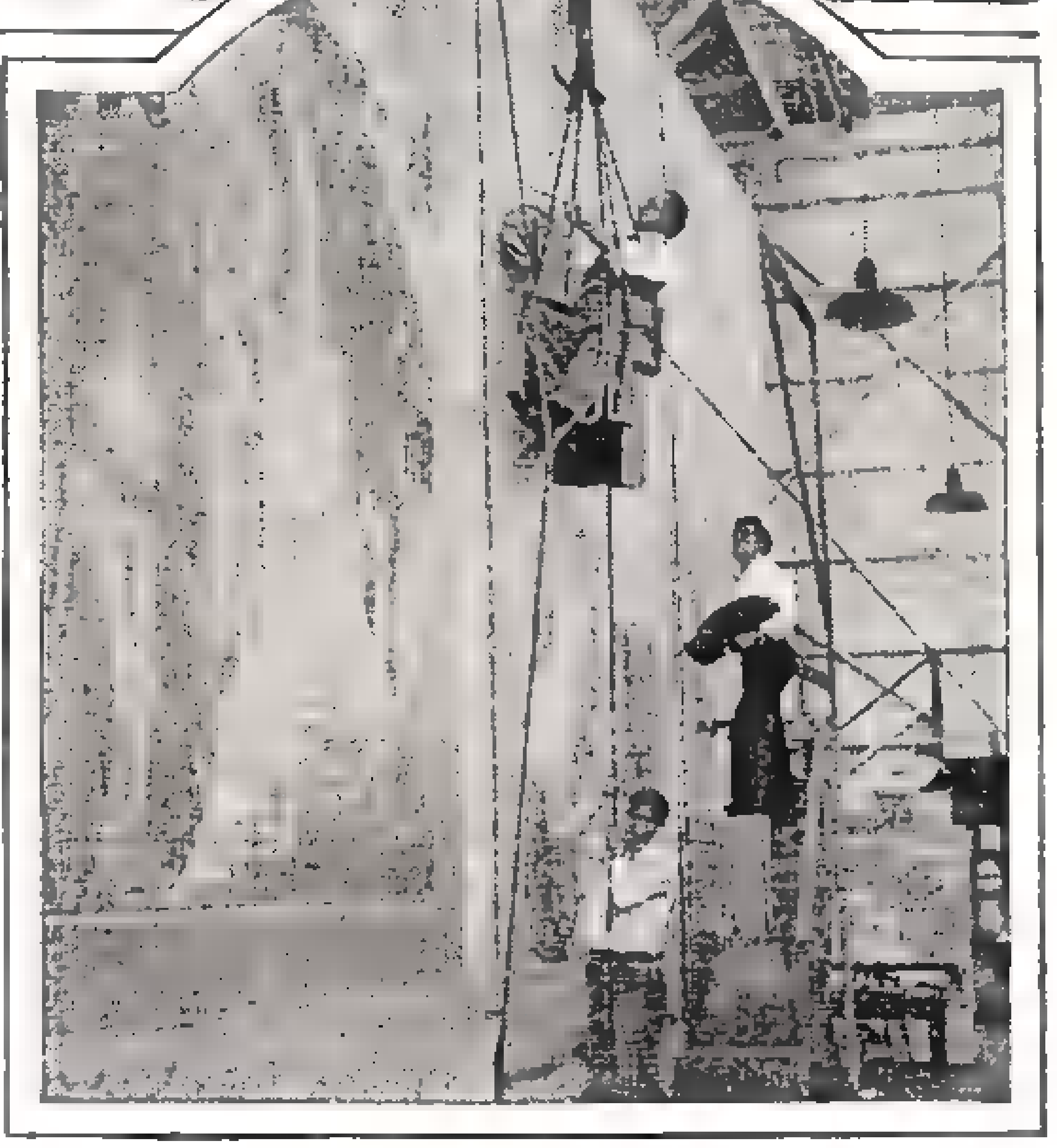


Section of [illegible] of the large paintings. Colors in the originals were carefully chosen for harmony with the library background [illegible] well as within the painting itself.

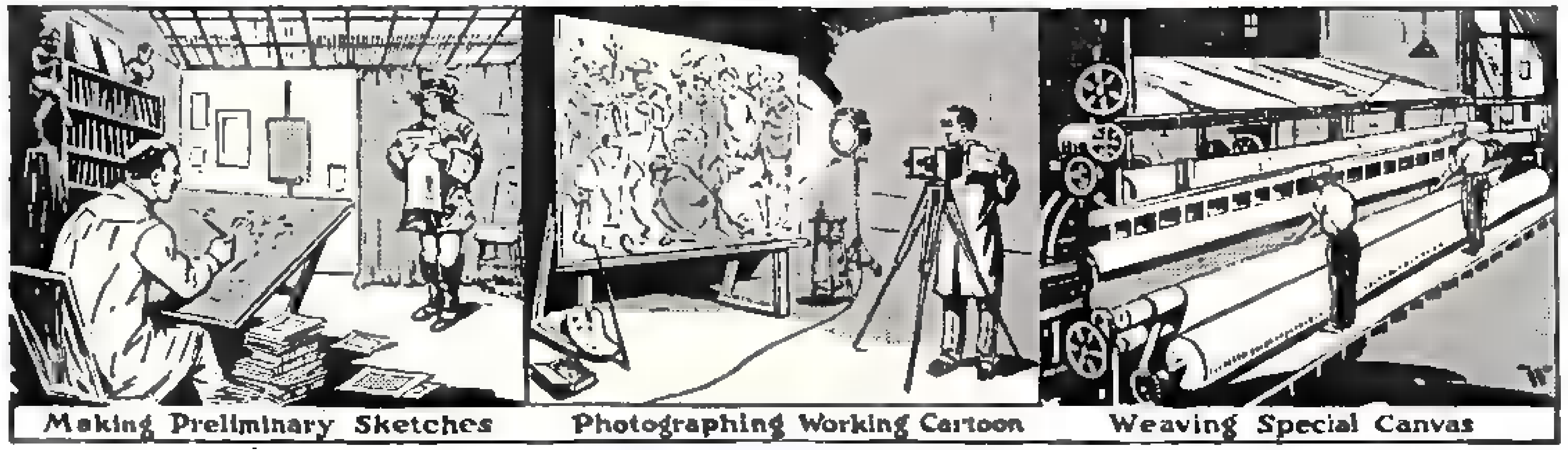
Ready for mounting on walls of the library rotunda, the smaller pictures weigh an even ton, the four major canvasses 3,000 pounds each. More than 300 pounds of liquid blue paint was required to paint skies alone. A total of 100 living models posed for the artist's preliminary sketches, while the completed murals contain approximately 300 human figures.

Three separate and duplicate coats of paint were applied as a protection against cleaning, dust, light and the ravages of time. Finally, it took five full years of painstaking, unremitting toil to complete the task.

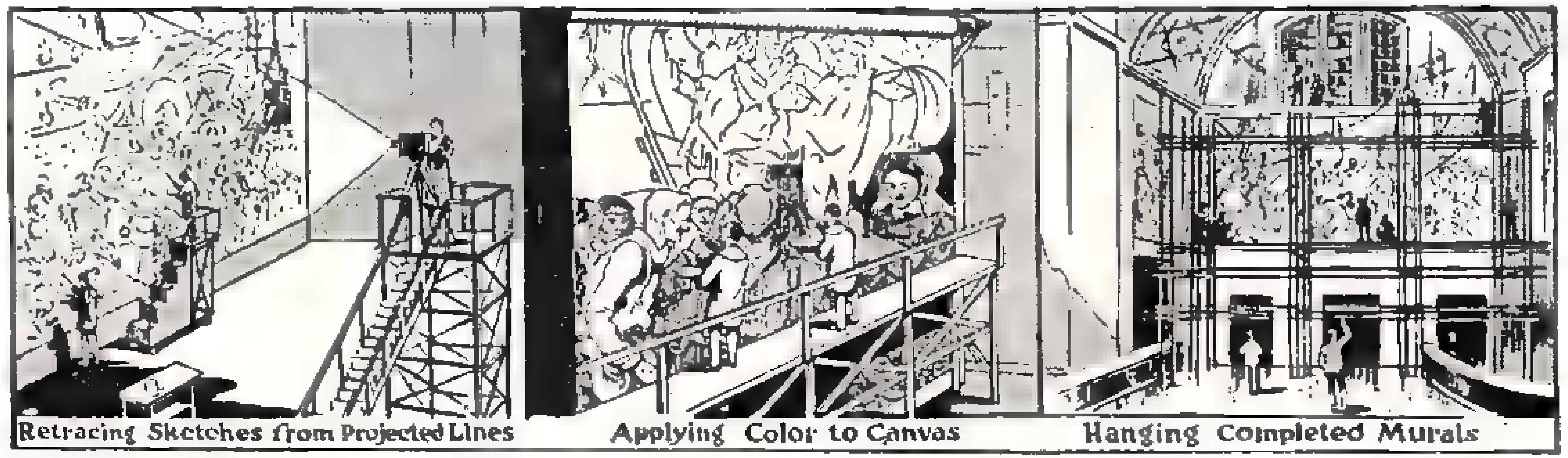
When awarded the contract in 1927, Cornwell's first step was an exhaustive research to which months were devoted. When thoroughly steeped with this lore and symbolism, he went to New York and set to work.



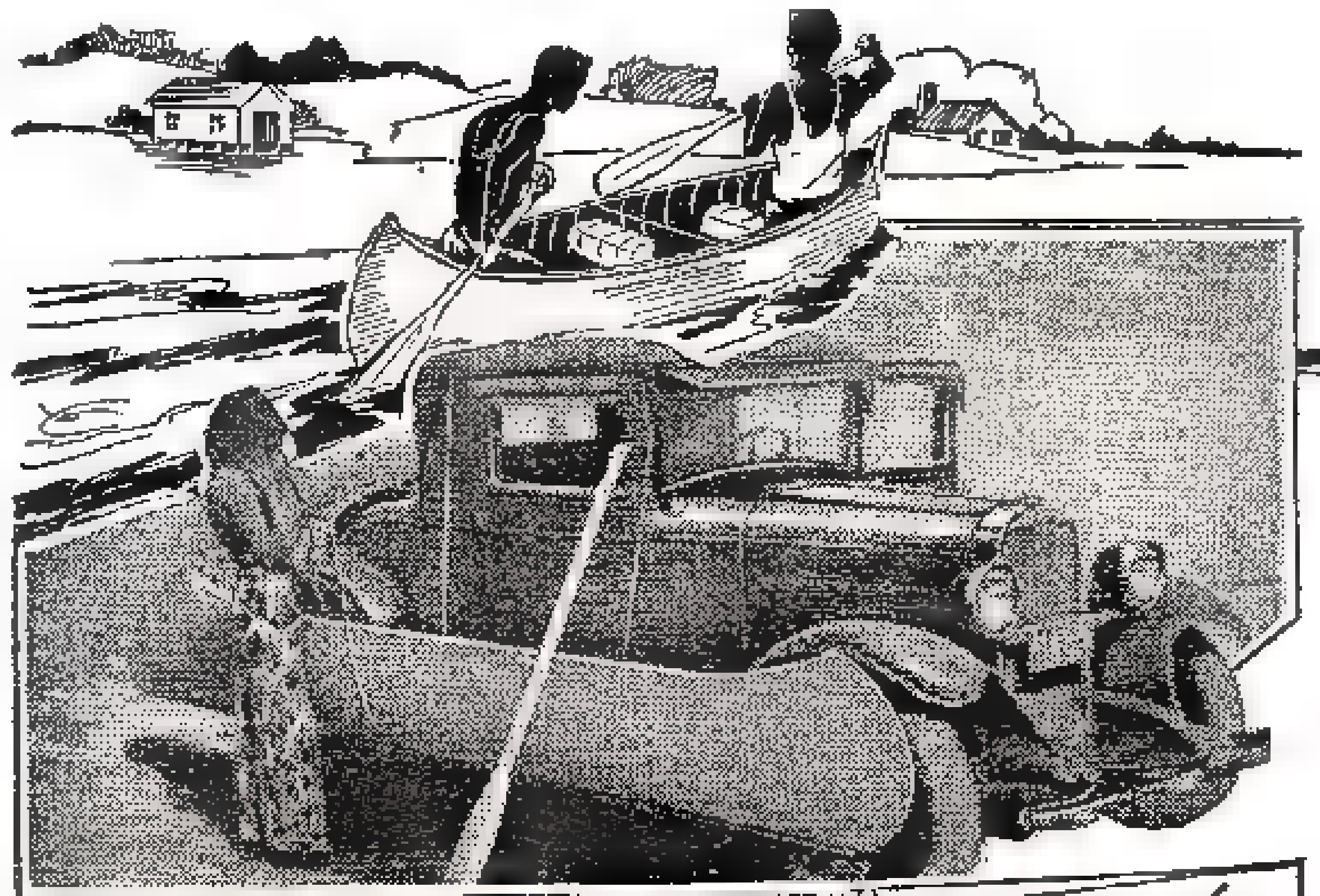
How paints were applied from a chair scaffolding moved from spot to spot by an assistant standing on the floor.



Step by step process of making the murals. A thousand preliminary sketches were made from living models, then these individual sketches [illegible] arranged in ordered groupings and photographed. Canvas, woven in Belgium, cost $25,000.



Photographs of the working cartoons were thrown on the canvas by a powerful projection machine and the outlines traced in exact accuracy. Three separate coats of paint were applied [illegible] protect against dust and time. Large murals weigh 3000 lbs.



A "DESERT Town" Canoe

by A. A. MURDOCH

Not a real Old Town canoe, but an amateur's home built and very serviceable "Old Desert Town" canoe is described here by Mr. Murdoch, who built one in Texas. You can do likewise in graduating to the real thing.

FOR us who live where boats of any sort, even toys, are unusual, the simple joys of gliding over the smooth surface of creek or lake or bobbing over the small waves of cove or bay are experiences read about in books, or at best witnessed in some moving picture. But with modern engineering and the construction of dams and extensive irrigation systems, there has come to even the desert dweller the opportunity to do a little boating on his own. Naturally we don't feel like putting out any considerable amount of labor or money on factory-built boats but we would like to have a light, serviceable craft of some kind to take with us on jaunts and picnics to the distant river, canal or reservoir. The duck season will be around again soon and those otherwise inaccessible hideouts can be reached if we have our portable, light draft boat along. Thirty hours spare time and at most $10.50 in cash will provide the missing canoe, for which the materials listed at the end of this article must be gathered together.

For typographical reasons we cannot run this list here, so turn to the end of the article now if you want to learn the cost and function of the parts.

The prices listed are the retail market prices for new, finished material. The cost of the canoe can be reduced, in most cases, one-half to two-thirds by the sawing of the different wood strips from ¾-in. white pine planks or other smooth-grained wood, by the use of discarded lattice or trellis work and the use of an old tent, porch curtain or tarpaulin. A similar canoe nine feet in length was built previously at a cash outlay of fifteen cents (for tacks) by using the makeshifts listed and asphalt roofing paint gleaned from forages into the left-overs of several new houses. The cash outlay on the canoe shown in the accompanying photographs was cut from $10.50 to $5.60 by using a discarded tarpaulin, nails, wire and one quart of paint on hand.

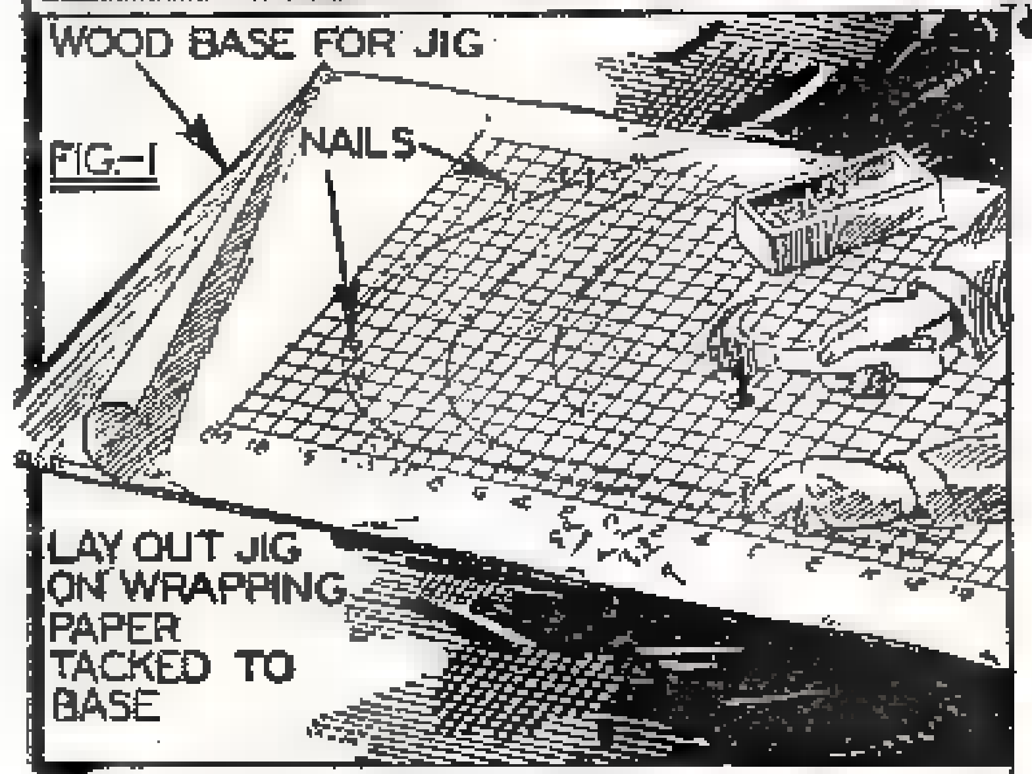
Place the barrel hoops and gunwale pieces in water to soak. The hoops will require only a tub or small pond of water but the gunwales will require a trough or ditch for entire submersion unless one end is done at a time, which was found to be satisfactory, and in which case three feet of each end is all that need be soaked. For want of anything more convenient, the rain trough under the eaves may be dammed temporarily and filled.

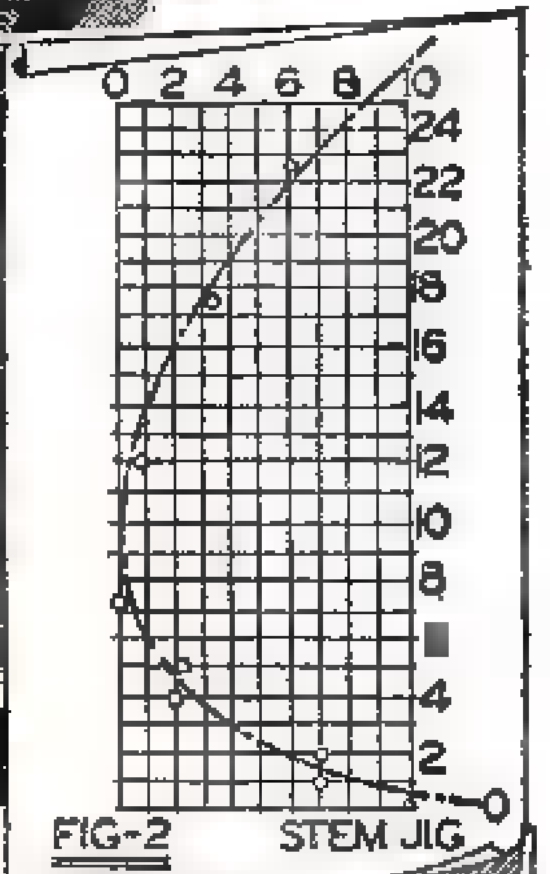
While the wood is soaking, construct the jig for forming the ribs and bow-pieces. Lay out on a sheet of wrapping paper the cross-section of 1-in. squares and locate the points indicated by Fig. 1. The wood base for the jig may be a barn door, loading platform or rough frame made of scrap lumber. Tack the paper layout to the wood base and drive 6D nails to a depth of one-half inch at the points marked.

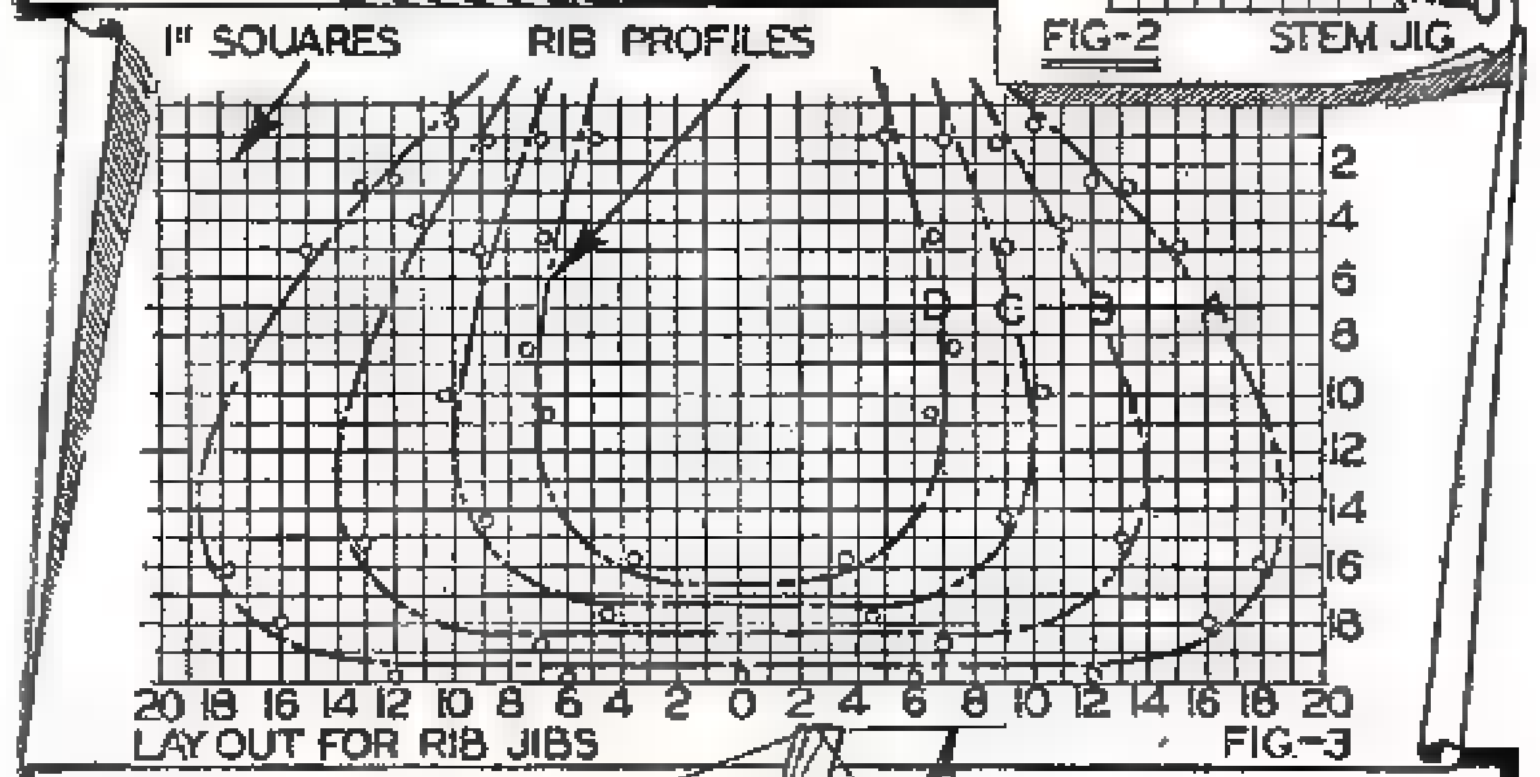
When the hoops have soaked for at least five hours, bend them into the jigs. Three hoops are placed in form A, two in form B, two in form C, and one in form D. Two hoops remain; these are cut at the middle to make four pieces half length, which are bent all together into the bow-piece jig. When placing the hoops in the jig, alternate the thin and thick sides. This will allow more space and facilitate placing. The jig should be placed in the sun to dry for six hours.

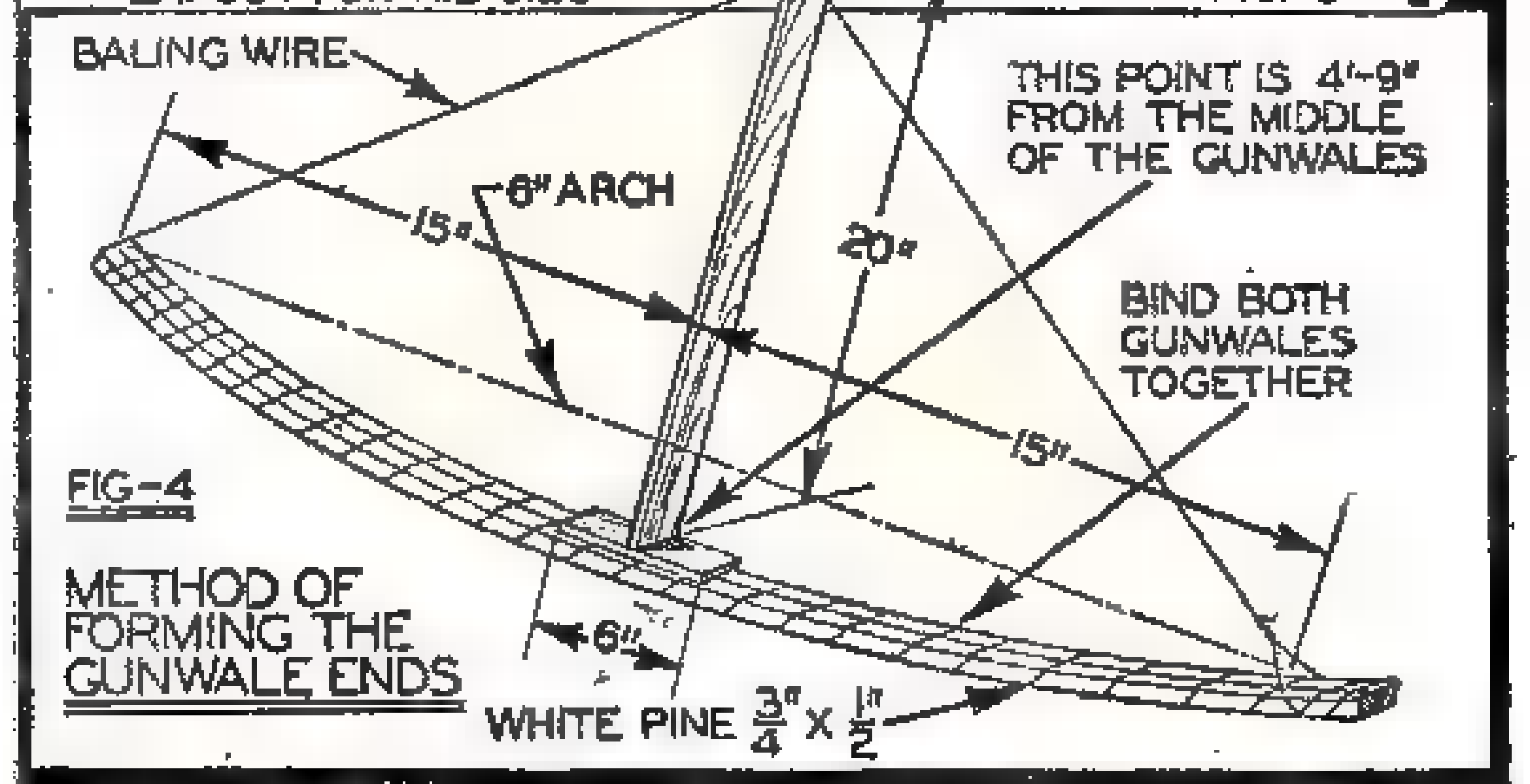
Bending the Gunwales

Next bend the ends of the gunwales. If one end is being done at a time, this may be done while the other end is soaking. Bind both gunwales together with wire and bend by the method illustrated in Fig. 2, the center of the curve being 4 feet, nine inches from the middle of the gunwale. To hasten the drying, a tub was inverted over a gas stove with one burner lighted and the bent portion of the gunwales thrust up under the tub well away from above the flame to avoid burning the wood as it dried. Doing one end at a time does not make fast drying advantageous on the first end as it will dry while the other end is soaking sufficiently for bending. The same wire and form may be removed from the finished end and used again. To determine whether the wood is dry enough to hold its shape, loosen the wire at one end. If no appreciable loss of curve is noticed, it is safe to remove the wires. In damp climates the gunwales should be placed into their positions in the canoe without allowing them to lie around loose


WOOD BASE FOR JIG
FIG-1
NAILS
LAY OUT JIG ON WRAPPING PAPER TACKED TO BASE


0 2 4 6 8 10
24 22 20 18 16 14 12 10 8 6 4 2 0
FIG-2
STEM JIG


1" SQUARES
RIB PROFILES
D C B A
2 4 6 8 10 12 14 16 18
20 18 16 14 12 10 8 6 4 2 0 2 4 6 8 10 12 14 16 18 20
LAY OUT FOR RIB JIBS
FIG-3


BALING WIRE
THIS POINT IS 4'-9" FROM THE MIDDLE OF THE GUNWALES
6" ARCH
15"
20"
BIND BOTH GUNWALES TOGETHER
15"
FIG-4
METHOD OF FORMING THE GUNWALE ENDS
6"
WHITE PINE ¾" x ½"

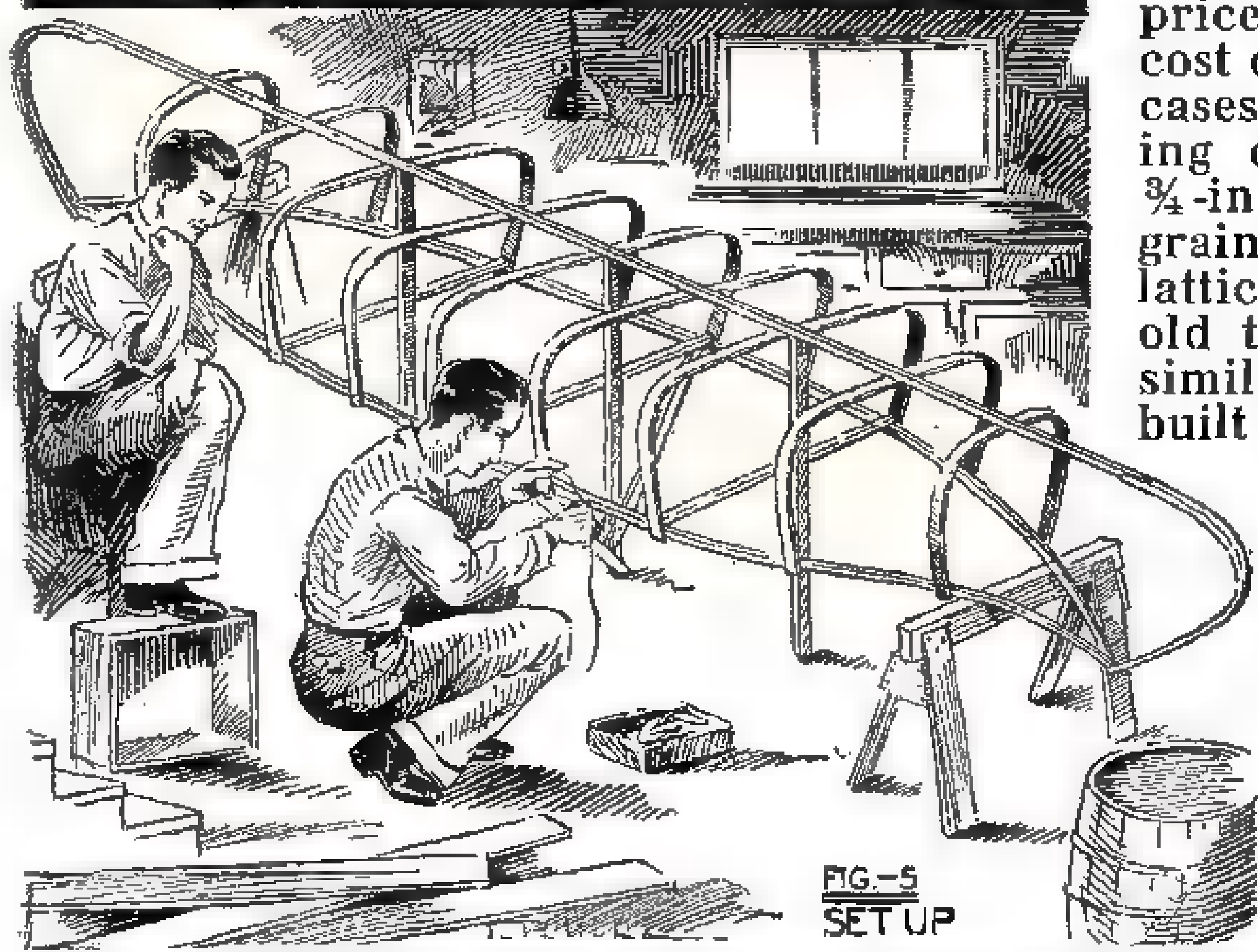


Fig. 3 shows how ribs are laid out; 4 and 5 show construction procedure.

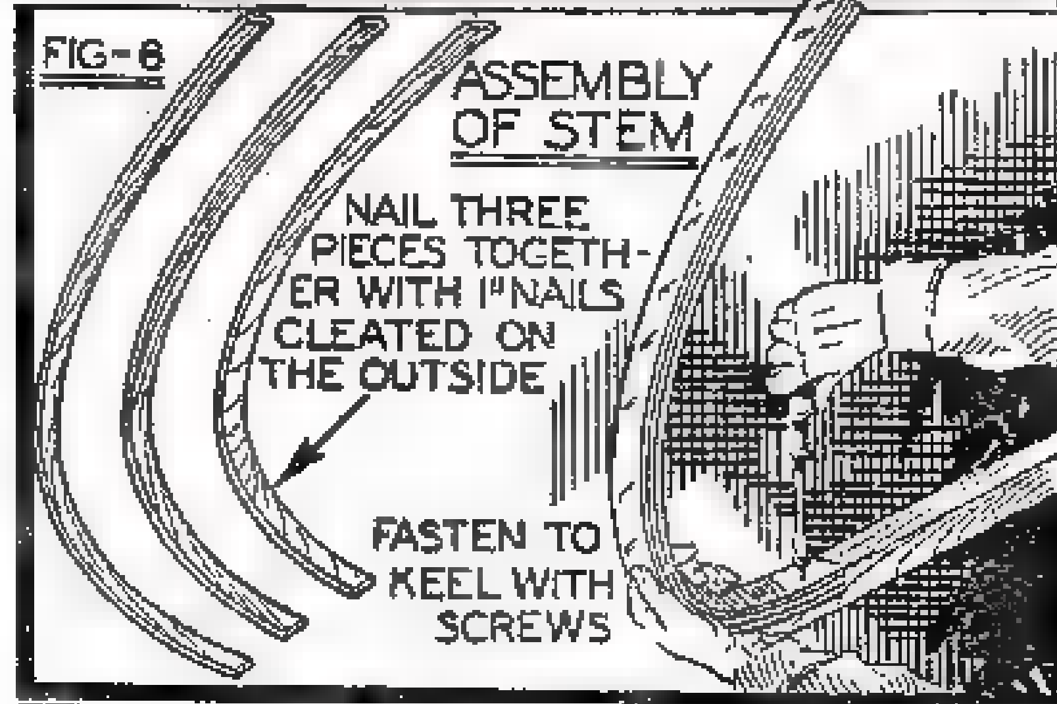
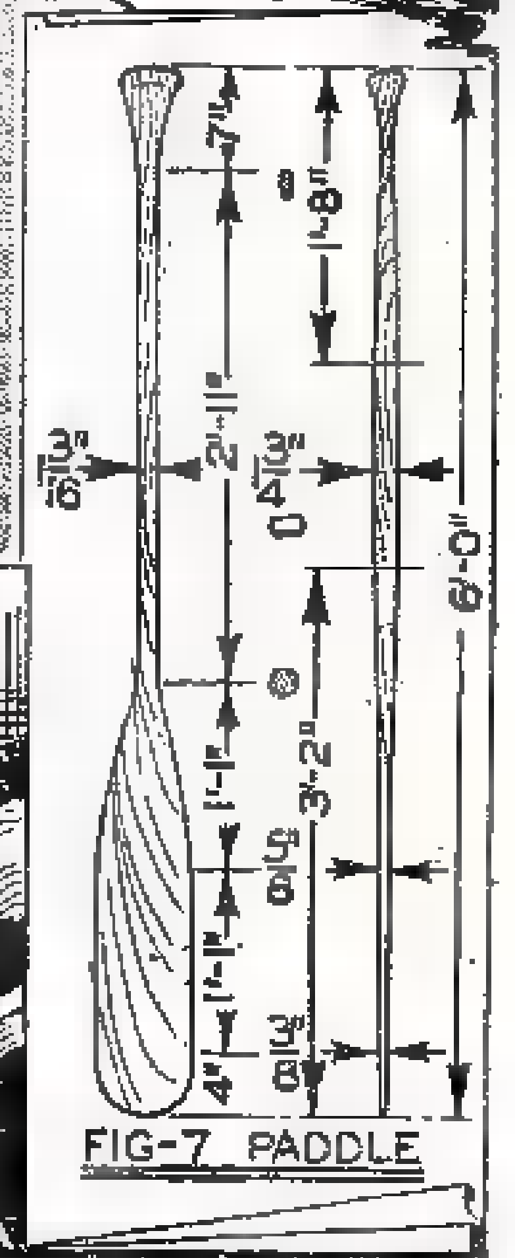
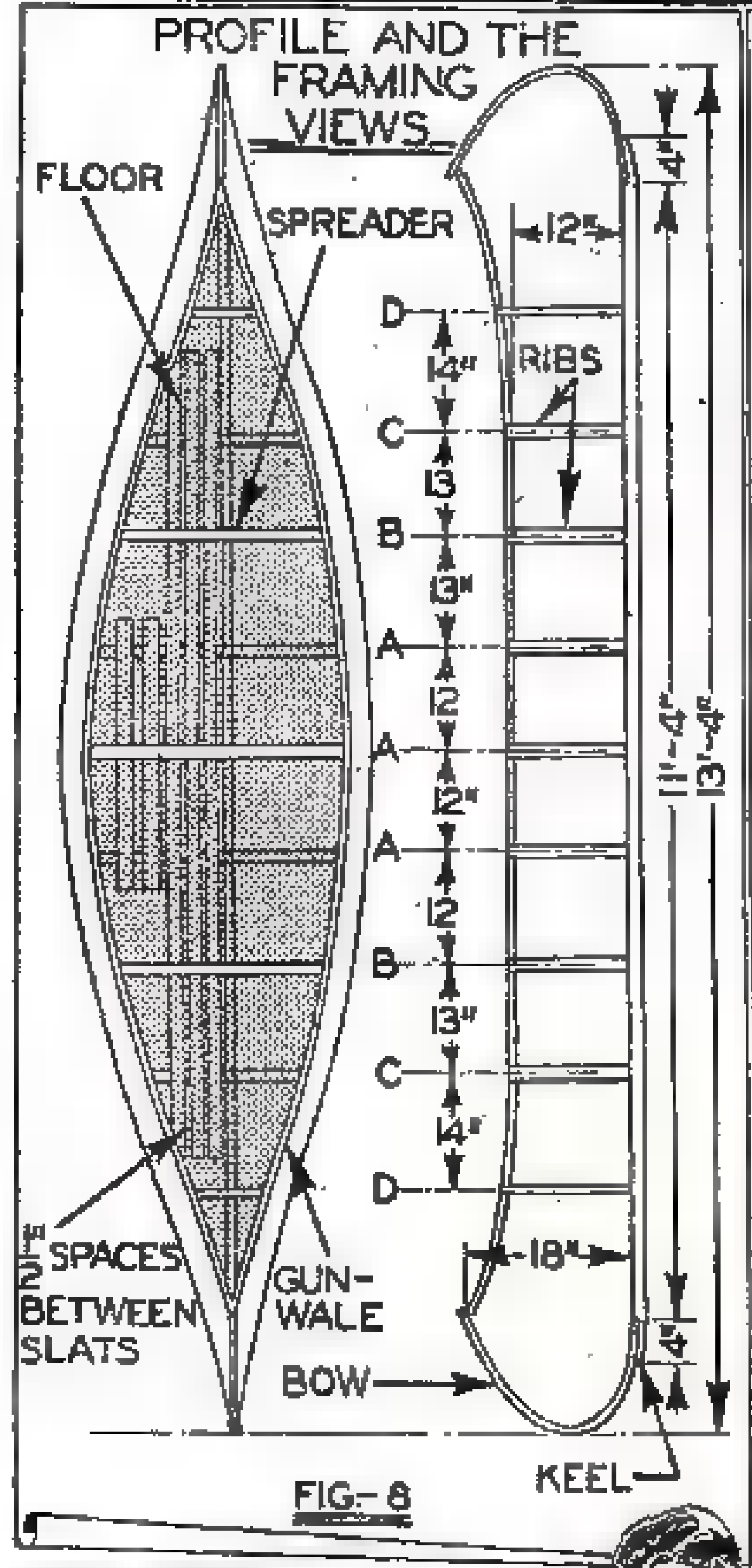
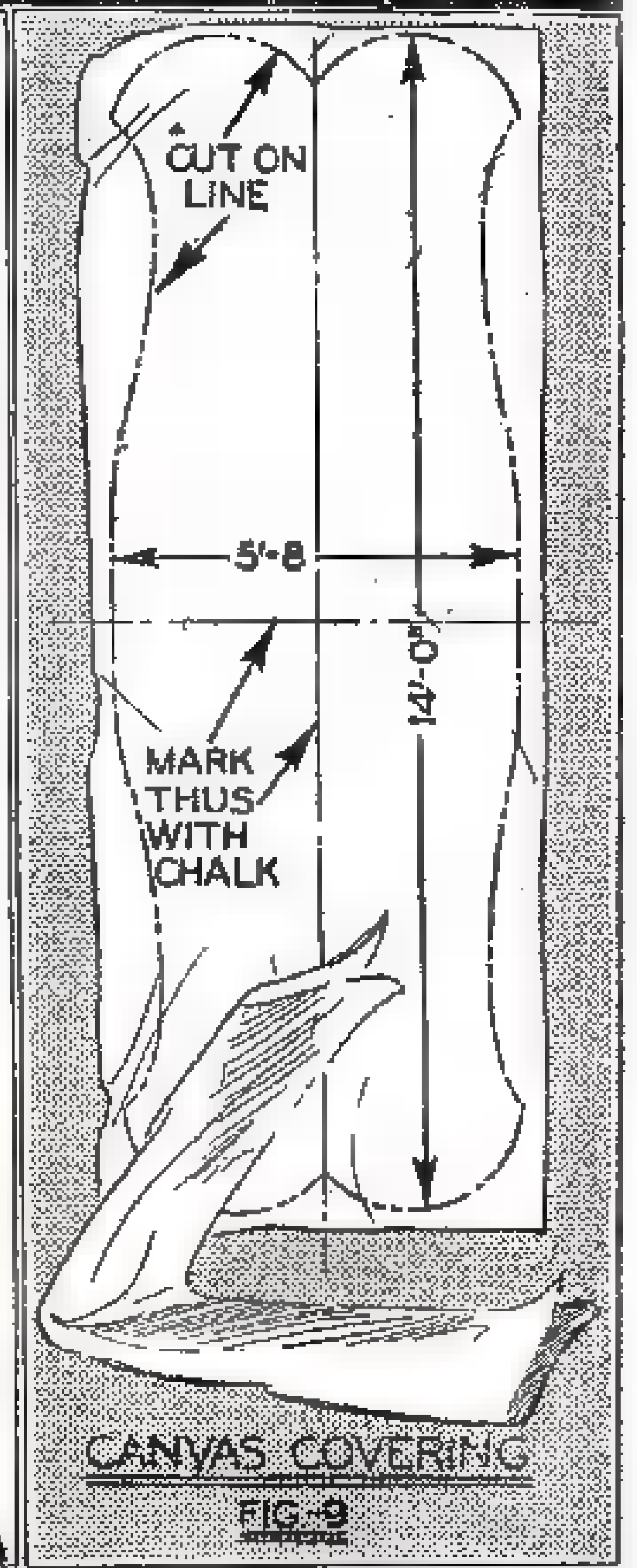
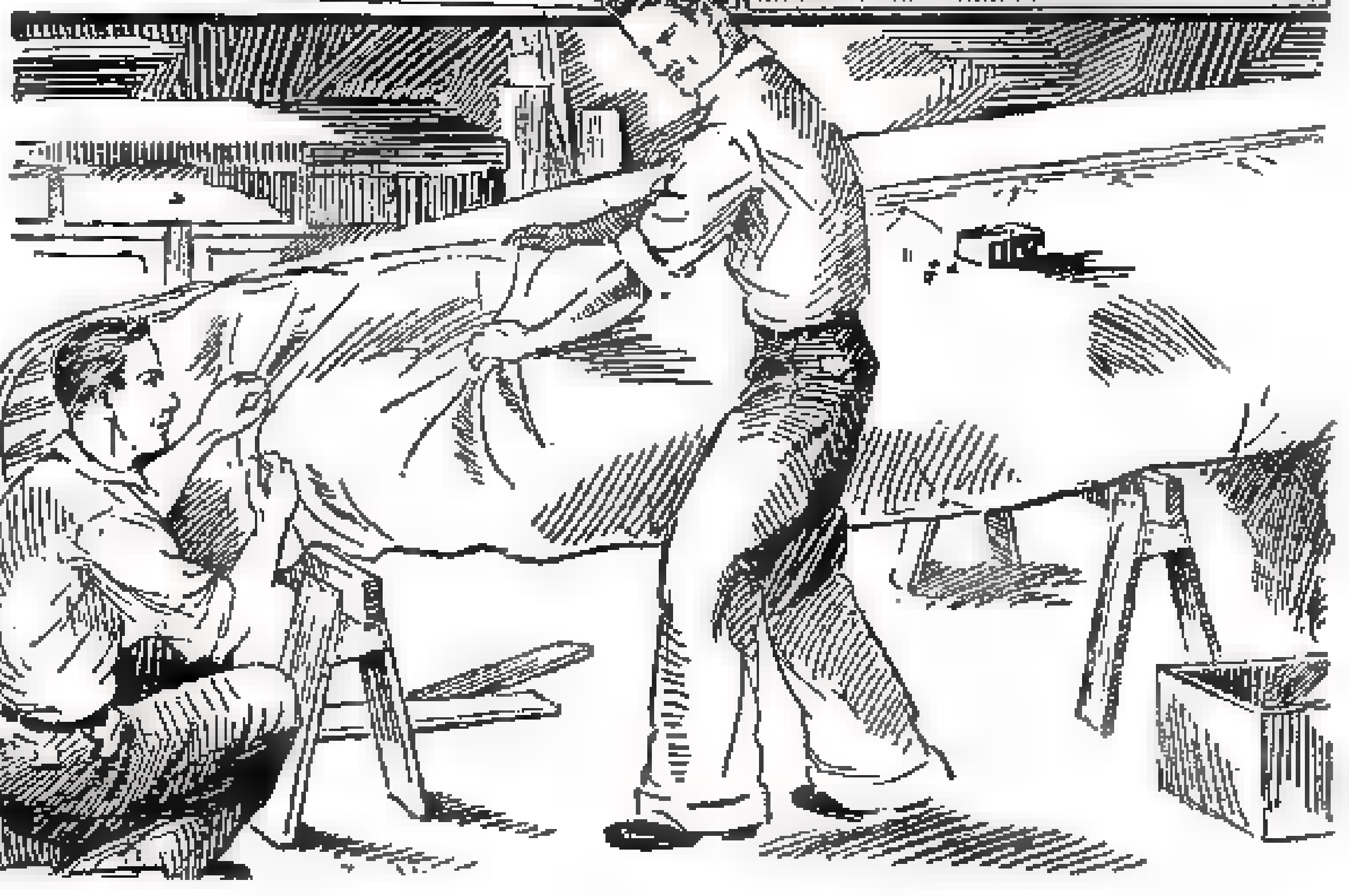


FIG-6
ASSEMBLY OF STEM
NAIL THREE PIECES TOGETHER WITH 1" NAILS CLEATED ON THE OUTSIDE
FASTEN TO KEEL WITH SCREWS


1⅜"
1⅛"
1'-8"
2'-1½"
1³⁄₁₆"
2½"
1¾"
0
6'-0"
1'-1"
3'-2"
⅝"
1'-1"
4"
⅜"
FIG-7 PADDLE

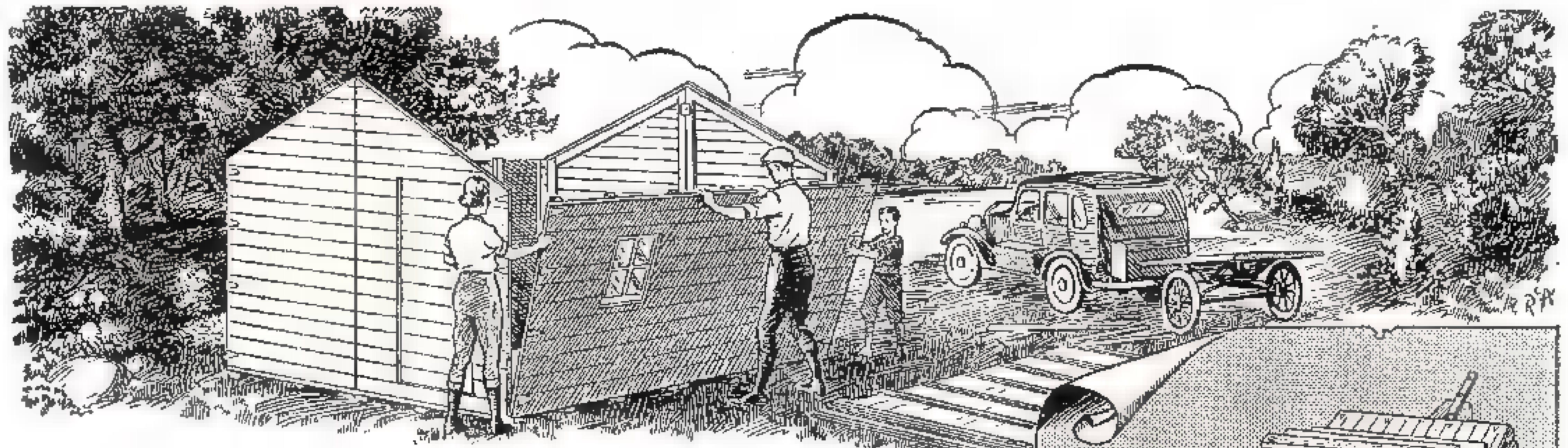

PROFILE AND THE FRAMING VIEWS
FLOOR
SPREADER
12½
4"
D
14"
RIBS
C
13
B
13"
A
12
A
12"
A
12
B
13"
C
14"
D
11'-4"
13'-4"
18"
4"
½" SPACES BETWEEN SLATS
GUN-WALE
BOW
KEEL
FIG-8

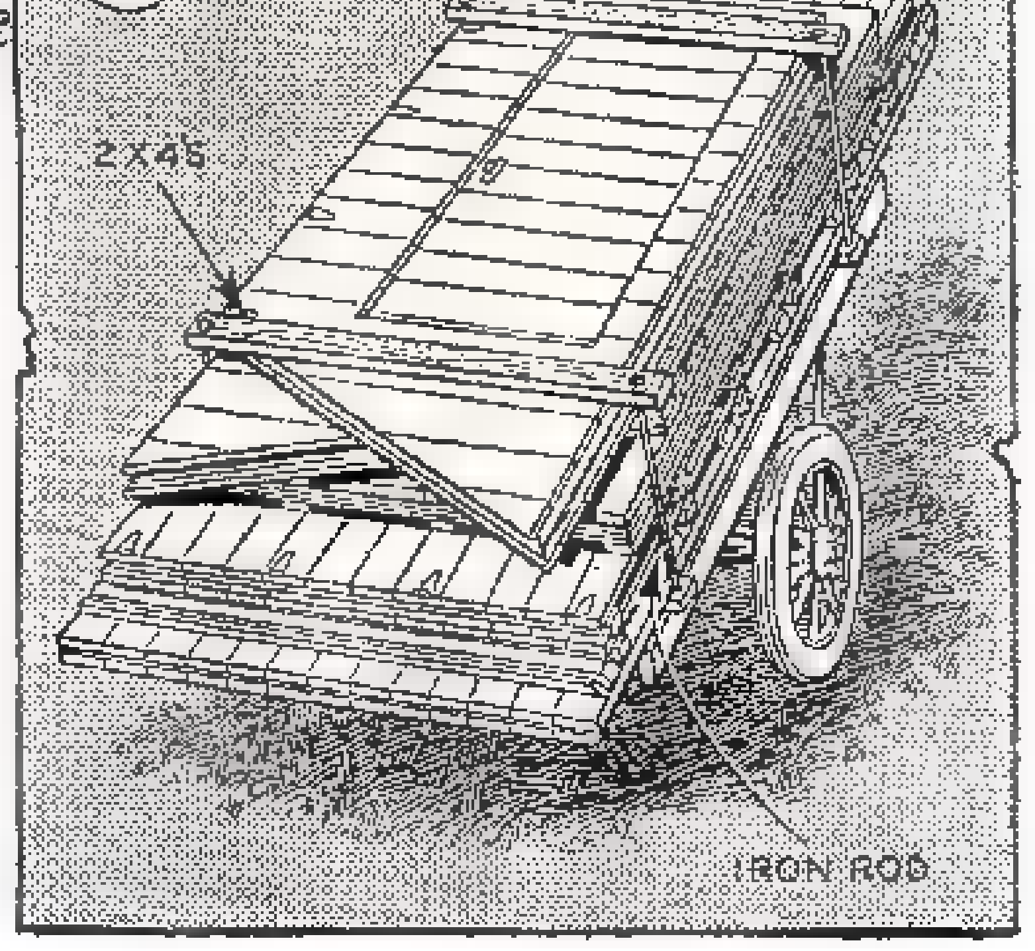

CUT ON LINE
5'-8
14'-0"
MARK THUS WITH CHALK
CANVAS COVERING
FIG-9



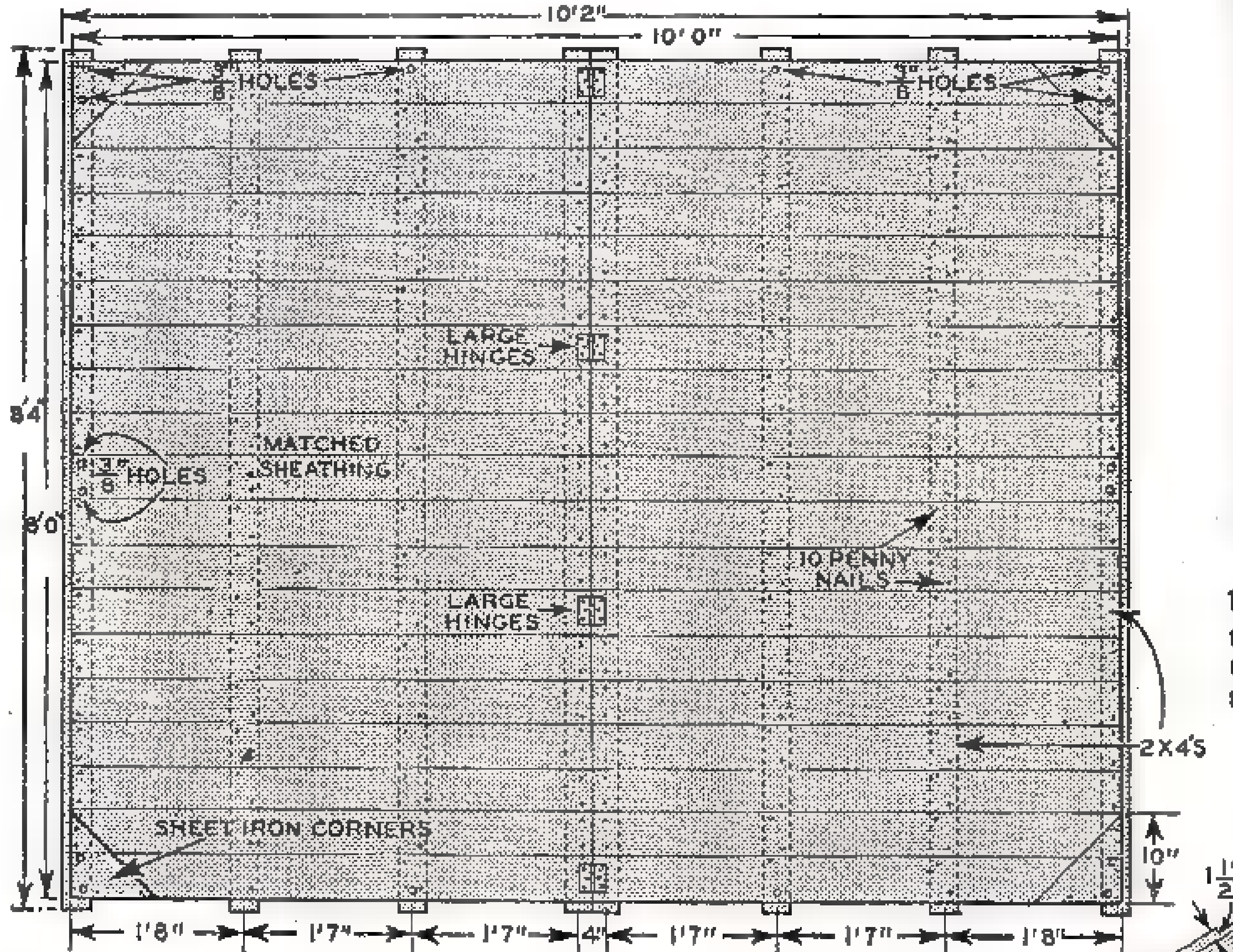
Construction details show simplicity of method of building.

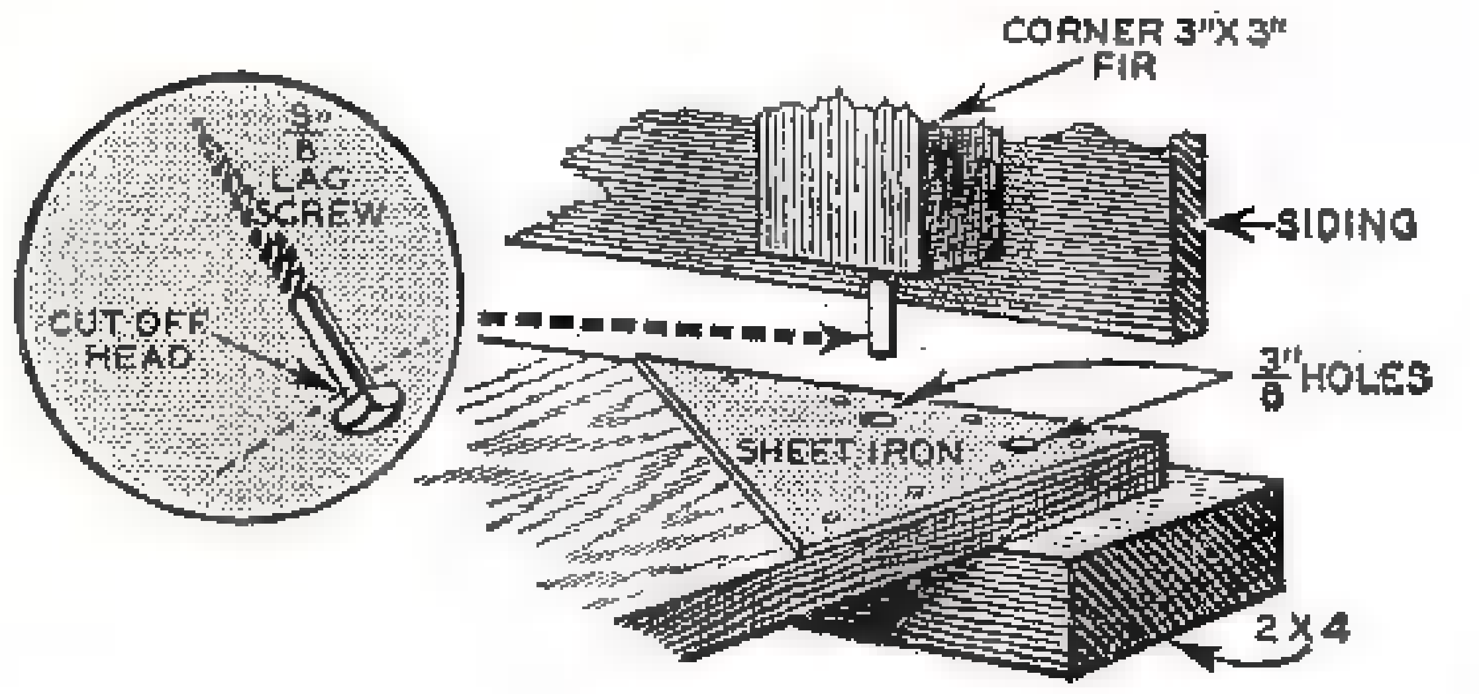
Trailer Carries This Portable Knock-down Cabin to Camp



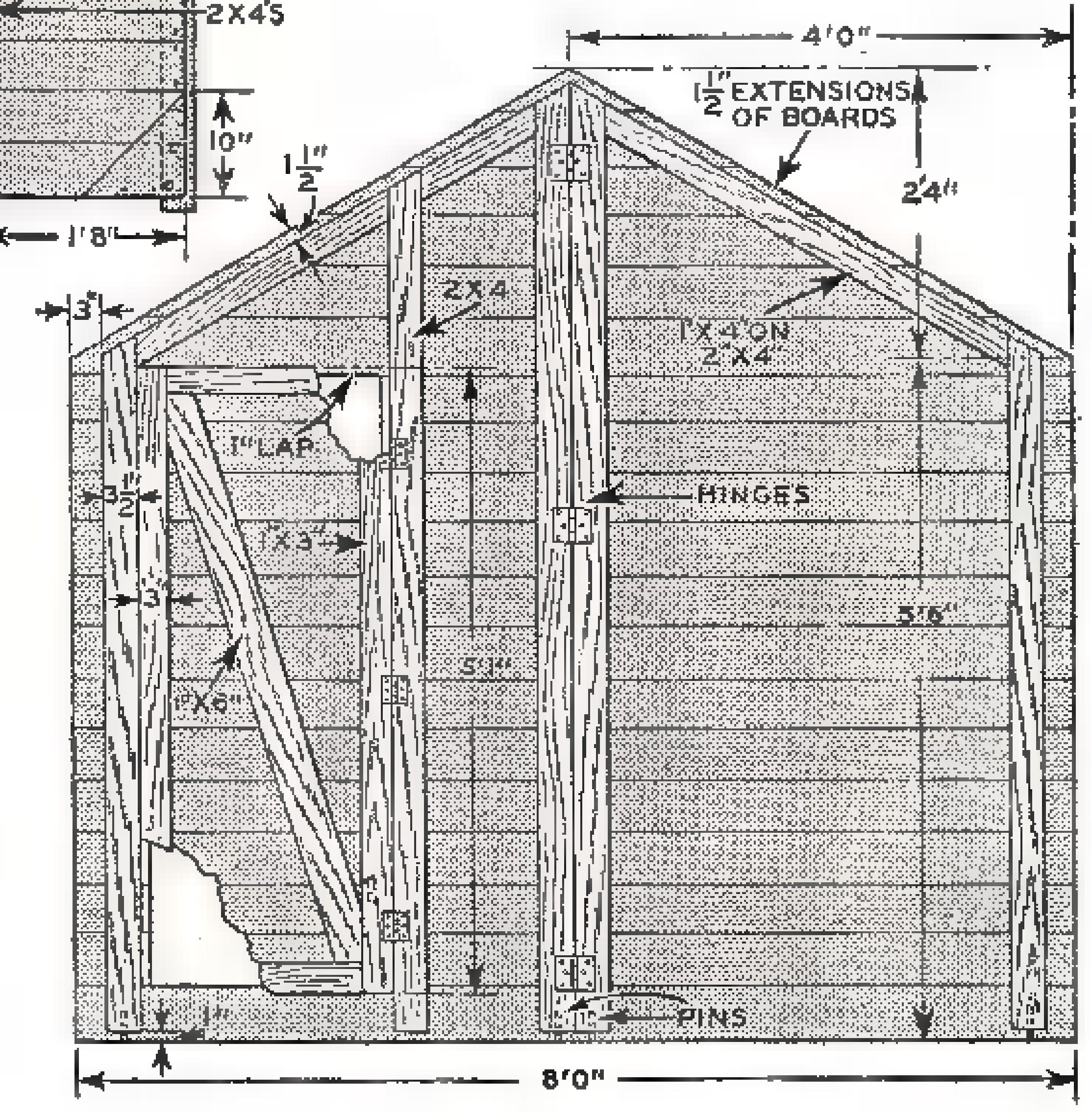

2X4'S
IRON ROD

Units of house a transported on trailer to camp site. 2x4's underneath and on top are joined by iron rods to clamp the units into a easily shipped bundle.


10'2"
10'0"
3/8" HOLES
3/8" HOLES
LARGE HINGES
MATCHED SHEATHING
3/8" HOLES
10 PENNY NAILS
LARGE HINGES
2X4'S
SHEET IRON CORNERS
8'4"
8'0"
10"
1'8"
1'7"
1'7"
4"
1'7"
1'7"
1'8"


CORNER 3"X3" FIR
SIDING
3/8" LAG SCREW
CUT OFF HEAD
3/8" HOLES
SHEET IRON
2X4

Assemble elements of floor and side as shown then cut down middle to form two hinged halves. Lag screws in side are set in 3/8 in. holes in floor to hold house in place.


4'0"
1 1/2" EXTENSIONS OF BOARDS
2'4"
10"
1 1/2"
3"
2X4
1"X4" ON 2X4
1" LAP
1"X3"
3 1/2"
3"
HINGES
5'6"
5'1"
1"X6"
1"
PINS
8'0"

THIS sturdy cabin has been designed for the fellow who wants to go somewhere and take a good shack along with him. It has the advantage that it can be slung on a trailer and taken wherever you can drive your car.

Once on the camp site, whether for 24 hours or a month, you flip the sections together and there before you stands a cabin you'll be proud of.

Beating rains can't bother; the floor won't sag, and with windows on each side you can regulate the ventilation to suit. The floor space is ample for 2 double beds, chairs, a small table—even a topsy stove for chilly weather. Let's look into the business of building it.

Briefly, this cabin is divided into 6 units—the roof, the two sides, the two ends and the floor. The floor, roof and ends are divided and hinged along the middle so that they may be folded to half their open area. A unique detail of locking the corners is by means of hinges screwed to the adjoining surfaces.

To take the cabin apart, the center hinge pins are removed, thus making this step simple and effective. Pins made from lag screws with the heads sawed off after being placed, extend an inch below certain studding and the corner posts. These protruding pins fit into holes in the floor, locking the floor and side walls.

To insure a tight fit at the ridge of the roof, a strip of canvas is nailed down under the hinges and over the roofing (if roofing is used) and this coated with hot asphalt.

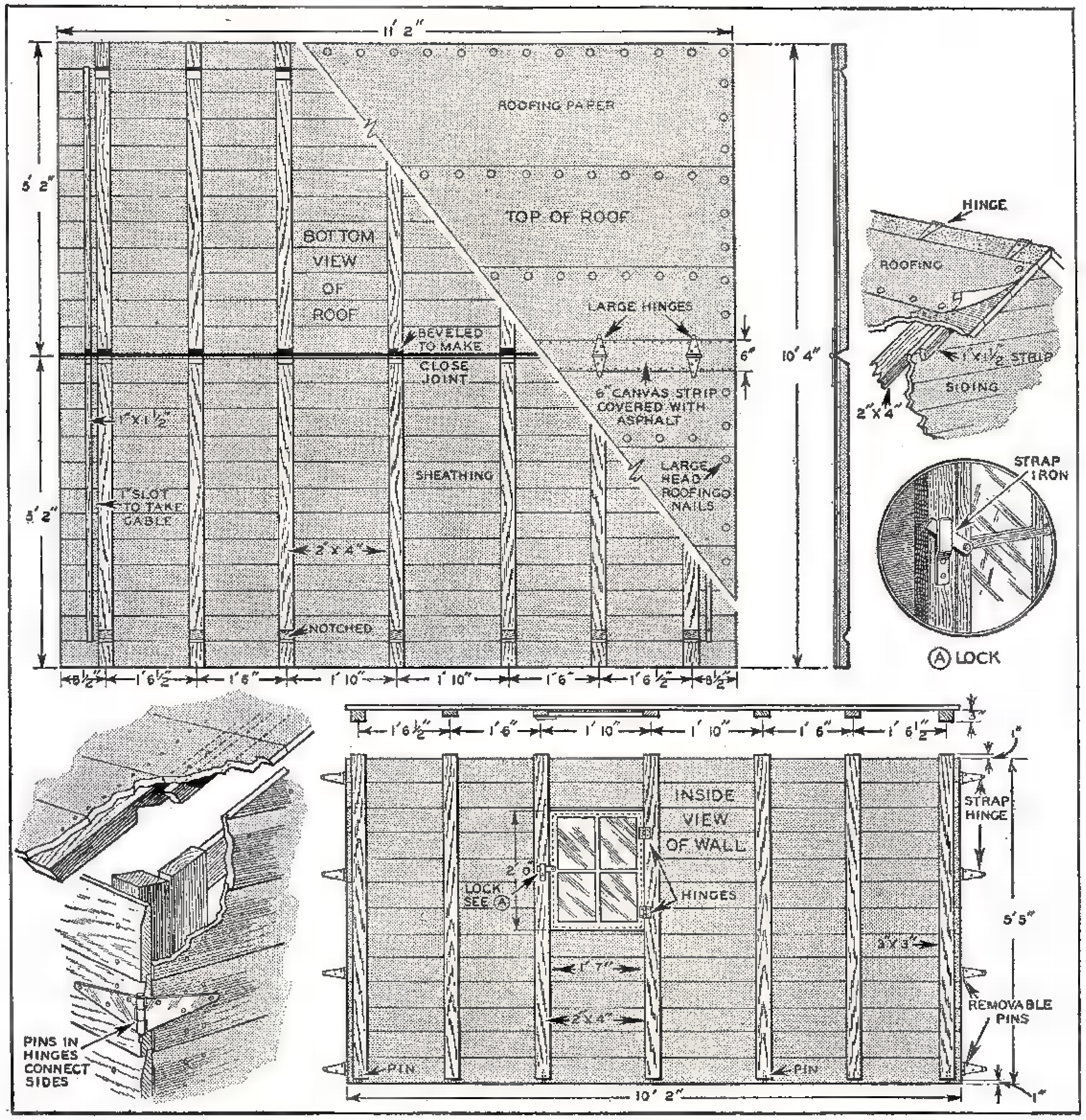
You'll find it advisable when making the floor to lay out your materials, then nail them together. When this is done, cut the piece down the center and apply the hinges as illustrated in an accompanying drawing.

Each side is alike. For one, lay the 2 by 4 in. pieces which are 5 feet, 5 inches long on a smooth surface and after spacing them, nail on the drop siding. Note that the siding extends 1 inch past each corner post. These posts are 4 by 4 fir planed down to 3 inches square for less weight.

The most practical way to install the windows is to hinge each sash as shown, cutting the opening through the side 1 inch smaller on each side than the sash.

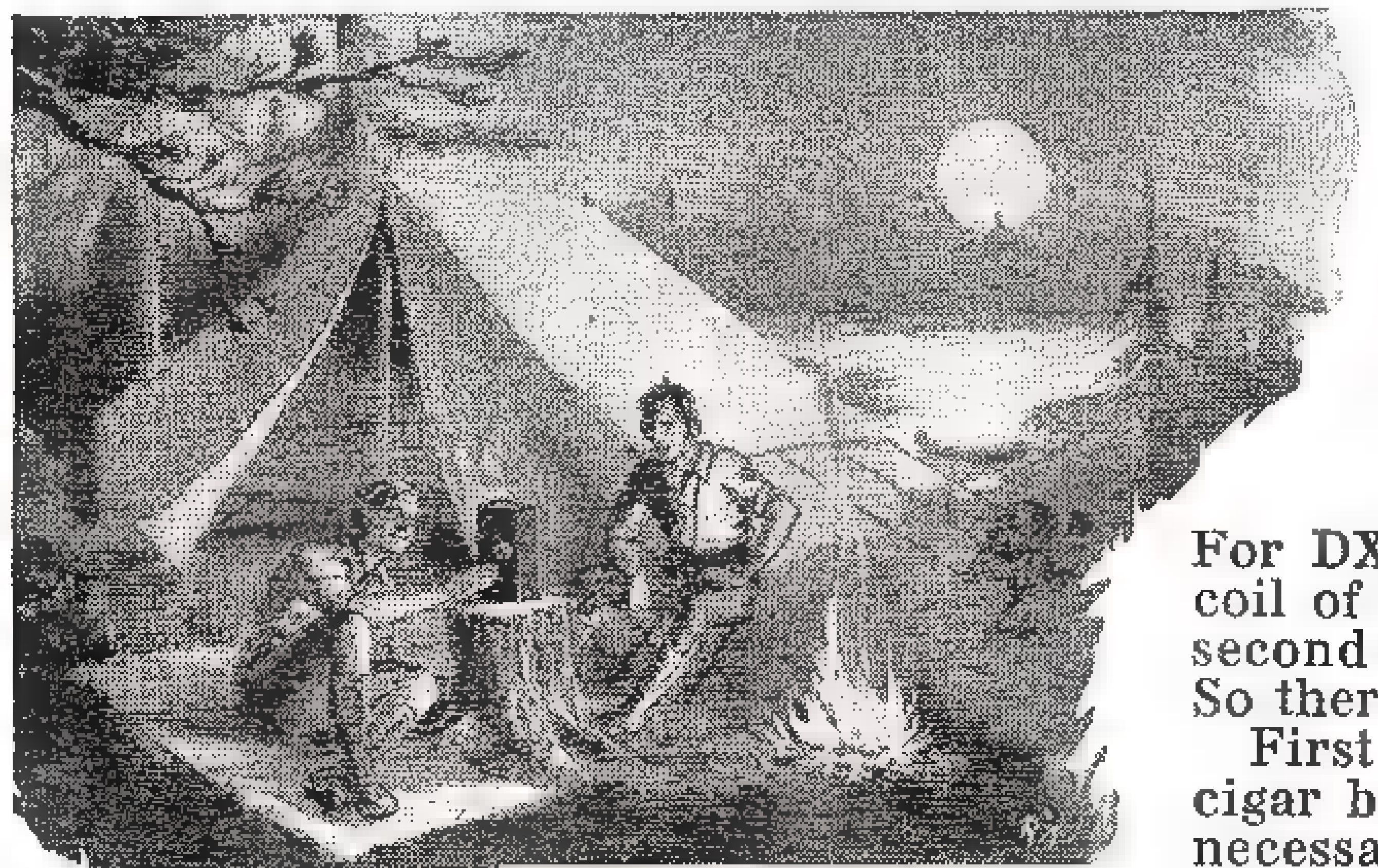
To make each sash fit quite snugly, cut and tack rubber strips (cut from an inner tube) around the four sides of the openings so that when the sash is closed, its four sides will press against the rubber.

(Continued on page 134)


11'2"
5'2"
5'2"
10'4"
ROOFING PAPER
BOTTOM VIEW OF ROOF
TOP OF ROOF
BEVELED TO MAKE CLOSE JOINT
LARGE HINGES
6"
6" CANVAS STRIP COVERED WITH ASPHALT
1"X1 1/2"
1" SLOT TO TAKE GABLE
SHEATHING
LARGE HEAD ROOFING NAILS
2"X4"
NOTCHED
8 1/2"
1'6 1/2"
1'6"
1'10"
1'10"
1'6"
1'6 1/2"
8 1/2"
HINGE
ROOFING
1"X1 1/2" STRIP
SIDING
2"X4"
STRAP IRON
Ⓐ LOCK
1'6 1/2"
1'6"
1'10"
1'10"
1'6"
1'6 1/2"
1"
INSIDE VIEW OF WALL
STRAP HINGE
2'0"
LOCK SEE Ⓐ
HINGES
5'5"
3"X3"
1'7"
2"X4"
REMOVABLE PINS
PIN
PIN
PINS IN HINGES CONNECT SIDES
10'2"
1"

Plans for top and sides. Roof has notches in rafters to join with studding in the sides. Join hinges with pin to hold sides.

Midgy Jr.—Complete Vacation Receiver in a CIGAR BOX



Completed receiver, shown above, may be carried like an ordinary camera. When set up in camp, in boat, or in auto, a small antenna should be strung up to bring in clear, loud signals ■ headphones.

WELL, radio fans, here's the latest in receivers. Here is a job that weighs less than four pounds including batteries. Lug it around like a camera or carry it in your brief-case, overnight bag, car pocket or even in a large overcoat pocket. It's all the same to Midgy Jr.

For local reception the only accessory is a pair of headphones. For DX work you will, of course, need a coil of flexible wire for an antenna and a second short piece for a ground connection. So there you are.

First clean off all tax tags, etc. from a cigar box and sandpaper the wood where necessary. Stand the box on end so the hinges are at the right. Across the box, 2⅞ inches down from the inside of the top, glue in a horizontal partition as shown for the A and B batteries. The lower section is for the receiver parts in the circuit, which are arranged as shown in the photo and drawing.

The parts can be wired with small flexible wire such as No. 22 or No. 24 covered with spaghetti to insure against shorts. Solder all joints where necessary and make sure of all bolted connections.

Winding the coils is a simple matter provided the accompanying winding diagram is carefully followed. Use No. 24 DCC wire, winding on tube bases and using the large and small prongs exactly as shown. The large prongs are for the tickler coil connections and the small prongs for the grid coil.

Solder the ends to windings into the prongs and flood the turns with Duco cement. The number of turns shown will suit the various bands although it may be necessary to add or subtract one or two turns from the grid coils to suit just the points in the bands you may wish to reach. This is a matter of cut and try.

On the inside of the cover fit in a piece of copper window screen wire for an antenna for local use. Connect this with a short piece of flexible wire to the antenna post on the outside of the box through a small hole for the same.

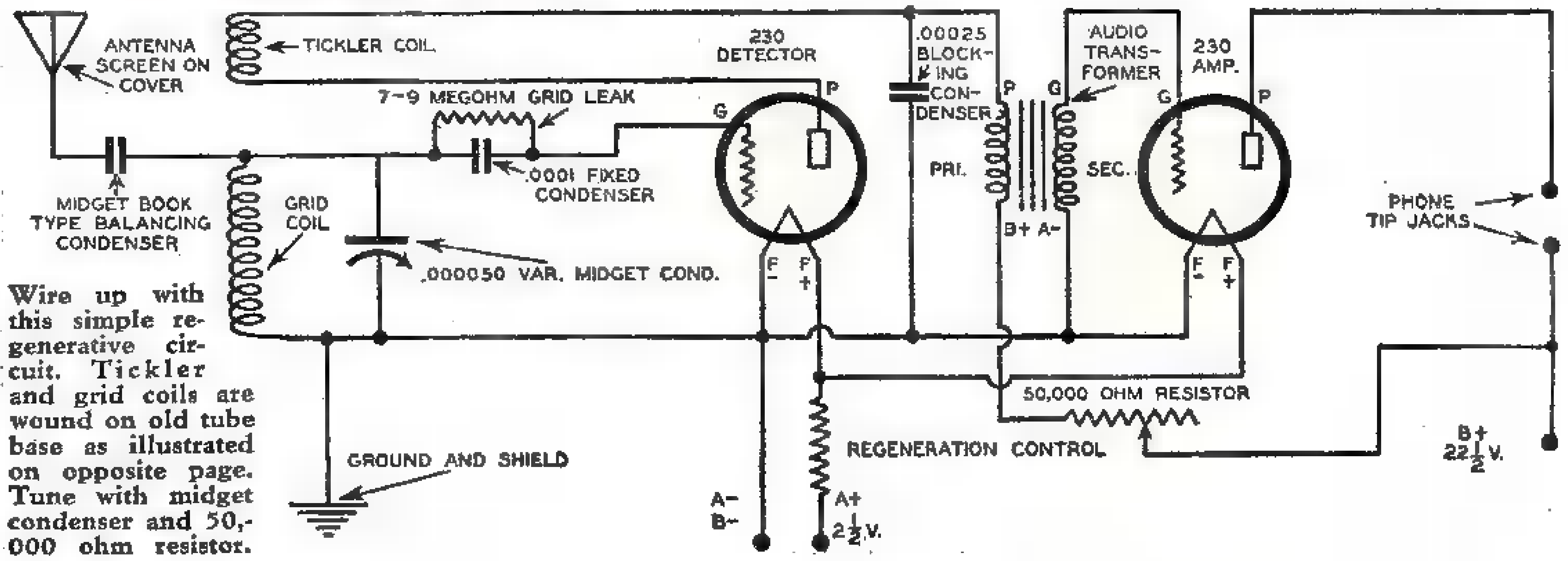
Then shellac the outside of the back, where the tuning condenser and variable resistor shafts come through and press on a sheet of heavy tinfoil to cover the entire surface. Plenty of shellac will make the foil adhere nicely.

Cut around every bolt and screwhead and projecting part so the foil will touch no metal part of the circuit. Then connect one corner of the foil to the ground post. This shielding is necessary to kill hand capacity that would otherwise make tuning very difficult.

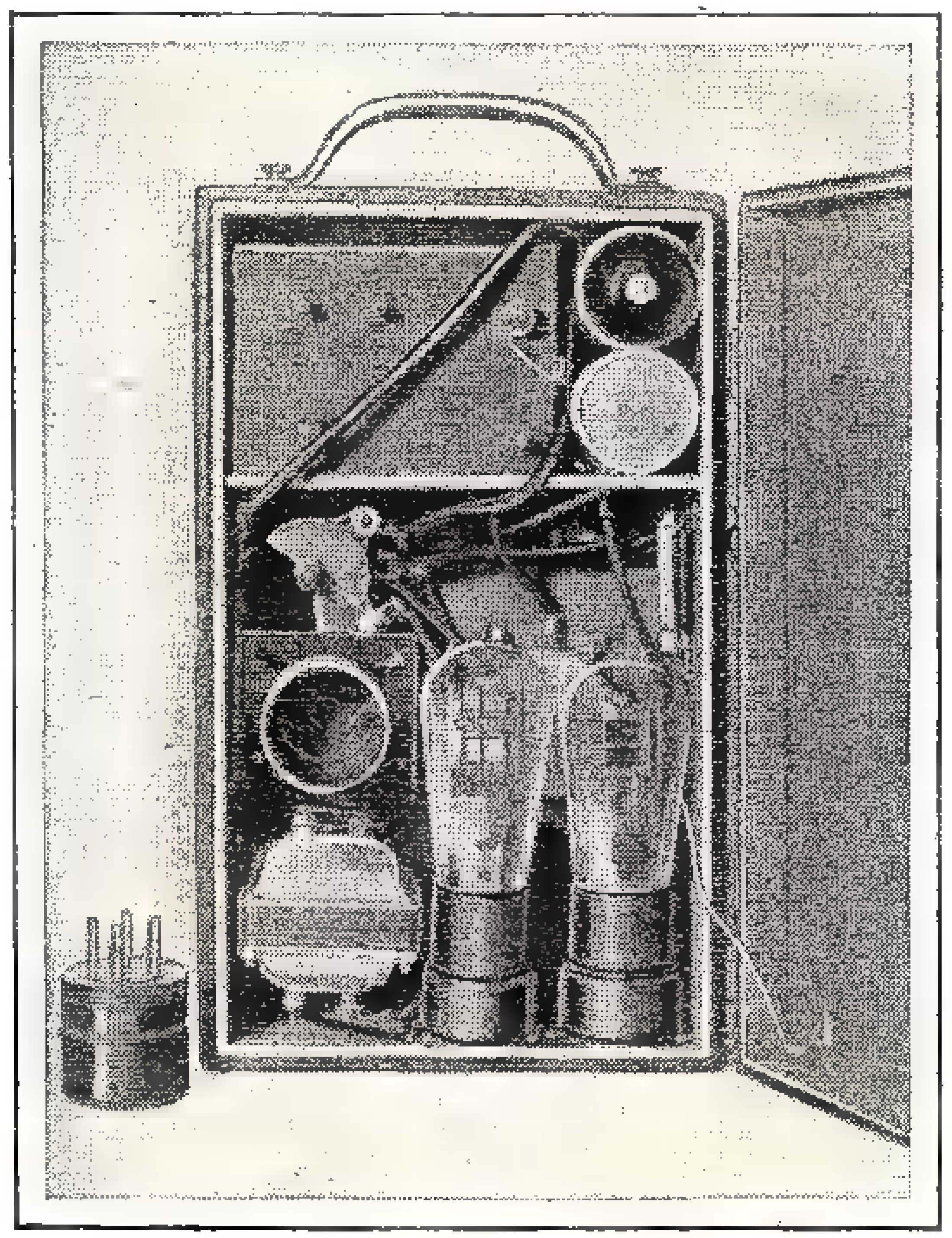
Put the two A battery cells (flashlight) in the case at the right and the 22½-volt B battery at the left. A suitable hold down can be made by jamming a slender stick of wood across the whole battery assembly between the sides. Then connect the A and B wires to the batteries, put in the phones and you are ready to go.

As before stated, if there are no local stations, antenna and ground wires will be needed. For real portability, it is possible to coil up some lengths of fine, flexible wire with clips on one end of each and tuck these inside the cover of the receiver. The extra tuning coils can be carried in the space above the tubes.

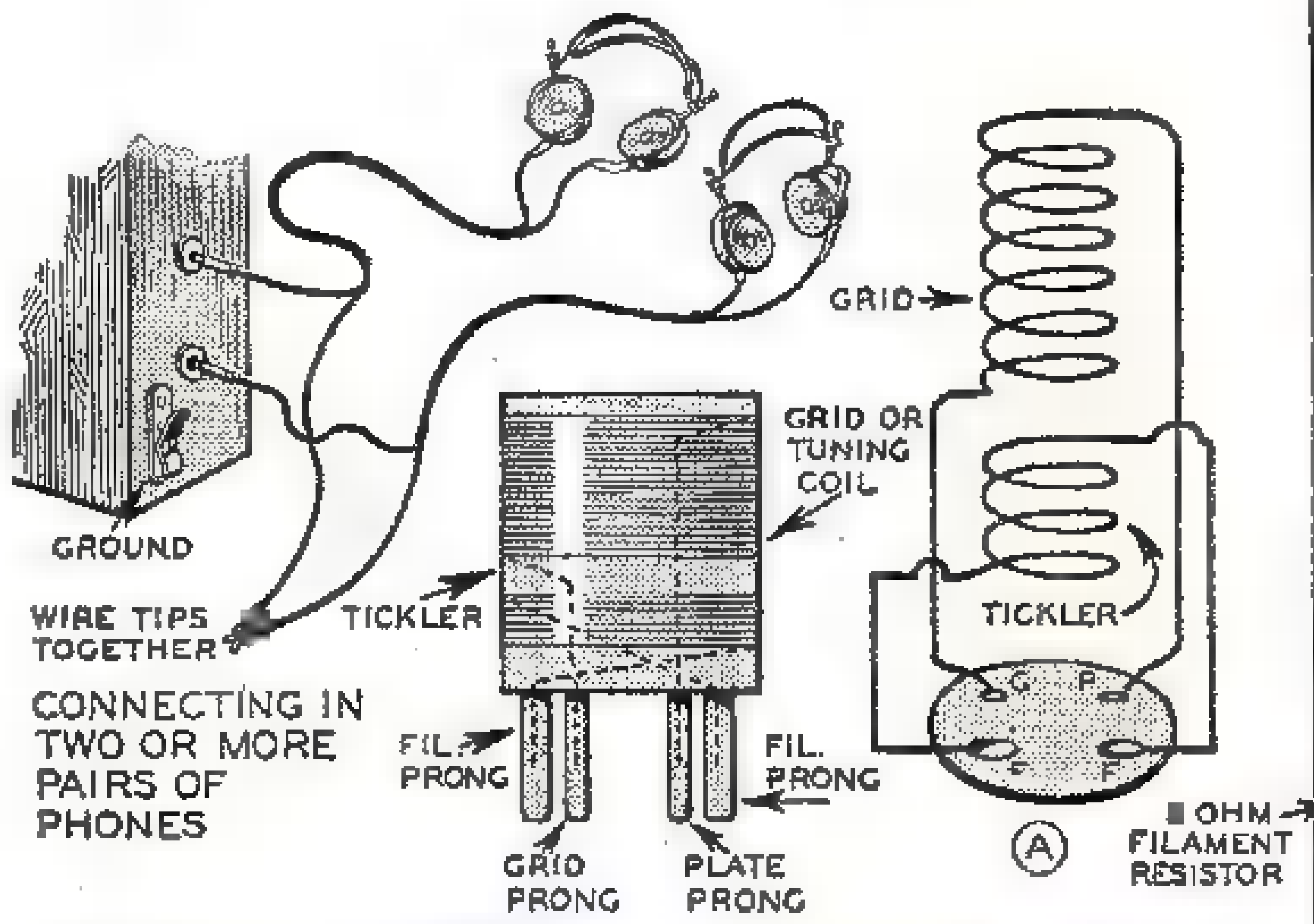
(Continued on page 134)


ANTENNA SCREEN ON COVER
TICKLER COIL
230 DETECTOR
.00025 BLOCKING CONDENSER
AUDIO TRANSFORMER
230 AMP.
7-9 MEGOHM GRID LEAK
G
P
.0001 FIXED CONDENSER
PRI.
SEC.
B+ A-
MIDGET BOOK TYPE BALANCING CONDENSER
GRID COIL
.000050 VAR. MIDGET COND.
F -
F +
PHONE TIP JACKS
50,000 OHM RESISTOR
REGENERATION CONTROL
GROUND AND SHIELD
A-
B-
A+
2½ V.
B+
22½ V.

Wire up with this simple regenerative circuit. Tickler and grid coils are wound on old tube base as illustrated on opposite page. Tune with midget condenser and 50,000 ohm resistor.



Arrange parts in cigar box as illustrated in this photo.


GROUND
WIRE TIPS TOGETHER
CONNECTING IN TWO OR MORE PAIRS OF PHONES
GRID
GRID OR TUNING COIL
TICKLER
TICKLER
FIL. PRONG
FIL. PRONG
GRID PRONG
PLATE PRONG
G
P
F
F
Ⓐ

	BAND	WIRE	GRID	TICKLER
THESE WAVE LENGTHS	METERS	NO 24 D.C.C.	TURNS	TURNS
ARE ONLY APPROXIMATE	300-500	″	145	55
AS CONDITION OF PARTS	200-300	″	90	35
AND ASSEMBLY WILL	125-190	″	42	18
GOVERN USE OF COILS—	65-85	″	20	10
TRY ONE AND SEE WHAT	35-45	″	9	7
IT WILL DO—THEN ANY	16-25	″	5	[illegible]
DIFFERENCES CAN BE ADJUSTED IN WINDING OTHERS				

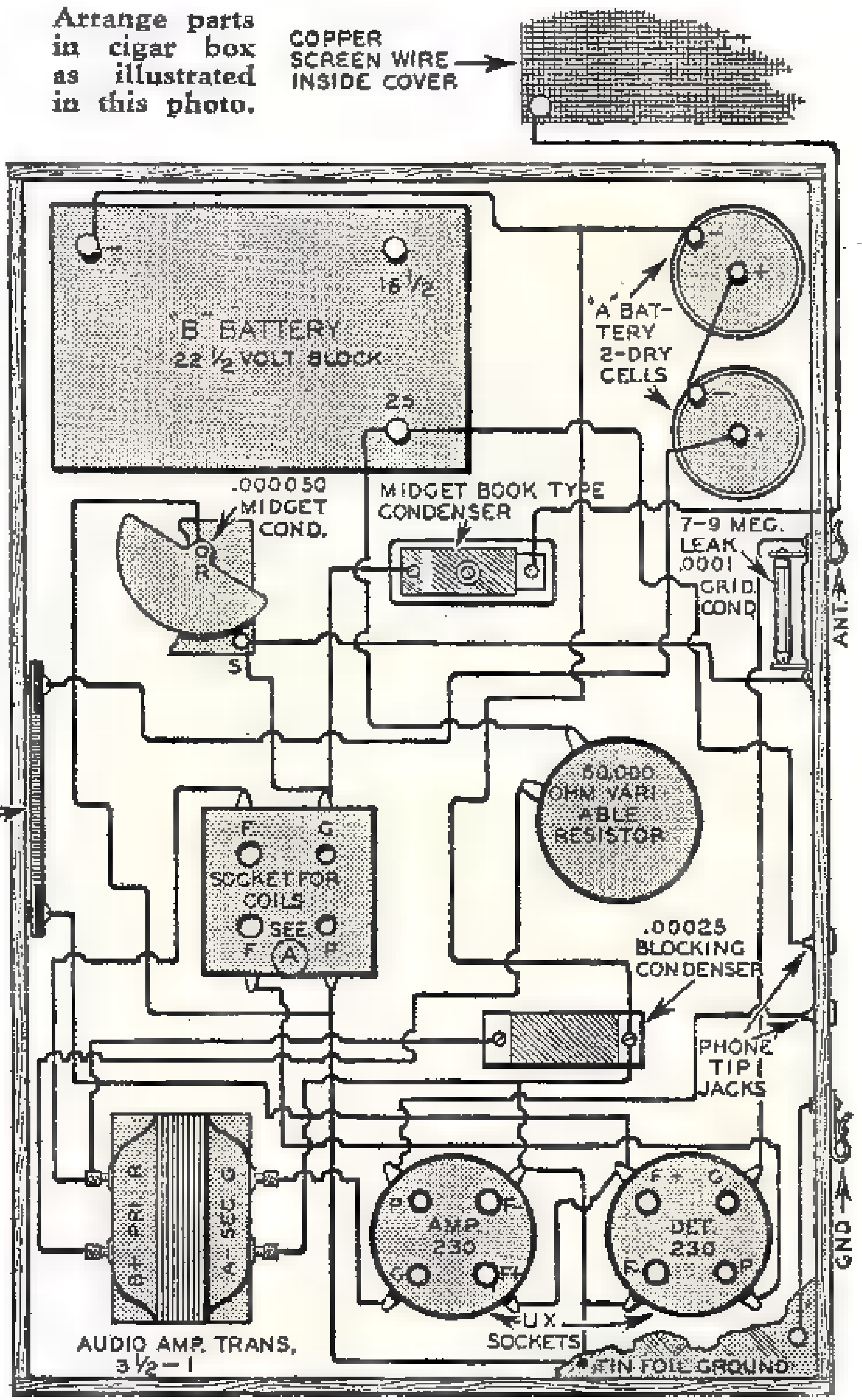
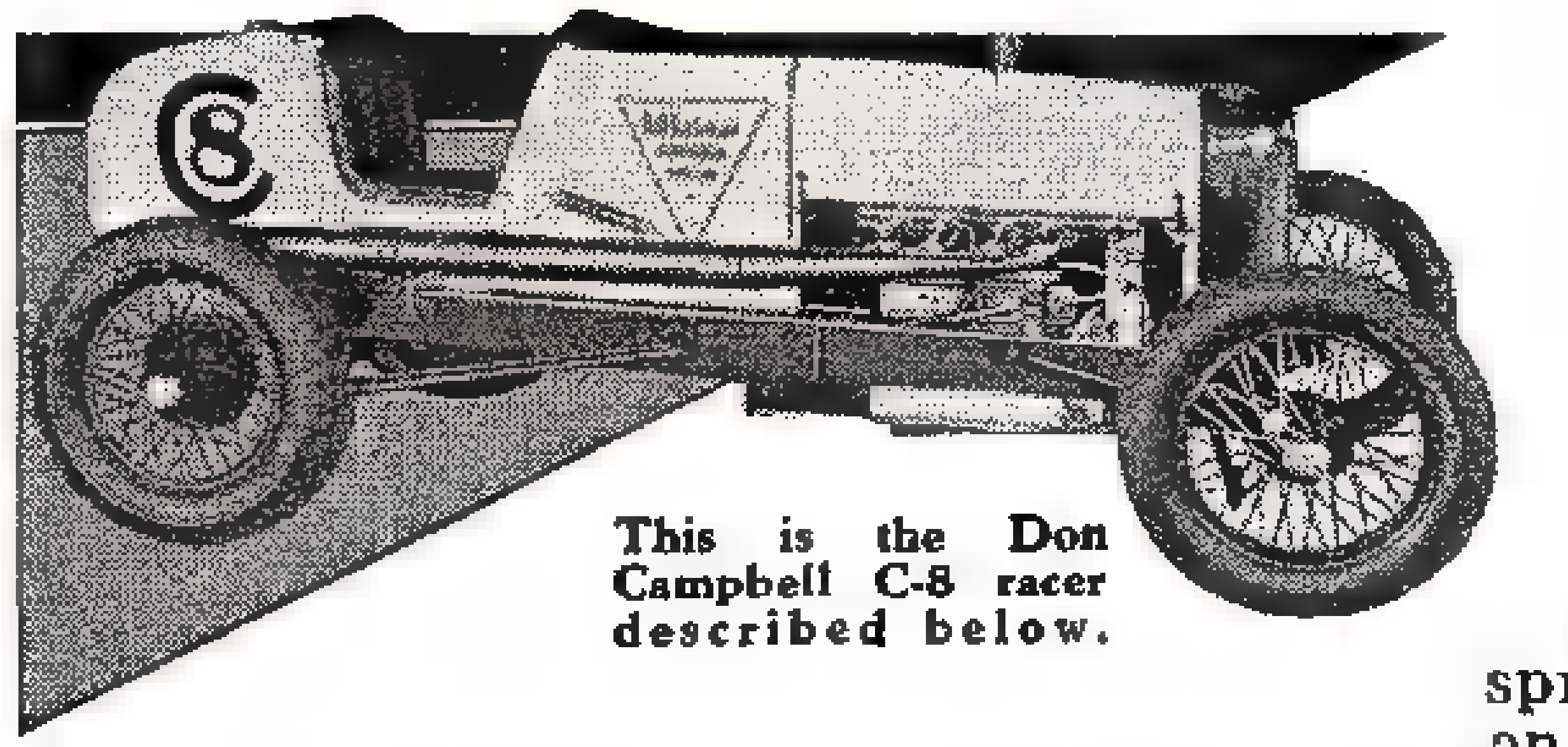

COPPER SCREEN WIRE INSIDE COVER
"B" BATTERY 22½ VOLT BLOCK
16½
25
"A" BATTERY 2-DRY CELLS
.000050 MIDGET COND.
MIDGET BOOK TYPE CONDENSER
7-9 MEG. LEAK .0001 GRID COND
ANT.
S
R
[illegible] OHM FILAMENT RESISTOR
SOCKET FOR COILS SEE Ⓐ
F
G
F
P
50,000 OHM VARIABLE RESISTOR
.00025 BLOCKING CONDENSER
PHONE TIP JACKS
B+ PRI. P
A- SEC. G
AMP. 230
DET. 230
UX SOCKETS
GND.
AUDIO AMP. TRANS. 3½-1
TIN FOIL GROUND

Diagram at right shows how parts are wired up in the cigar box. Copper screen antenna for local reception is secured to inside of lid, and connected to the antenna post.


This is the Don Campbell C-8 racer described below.

PLANS for a RACER

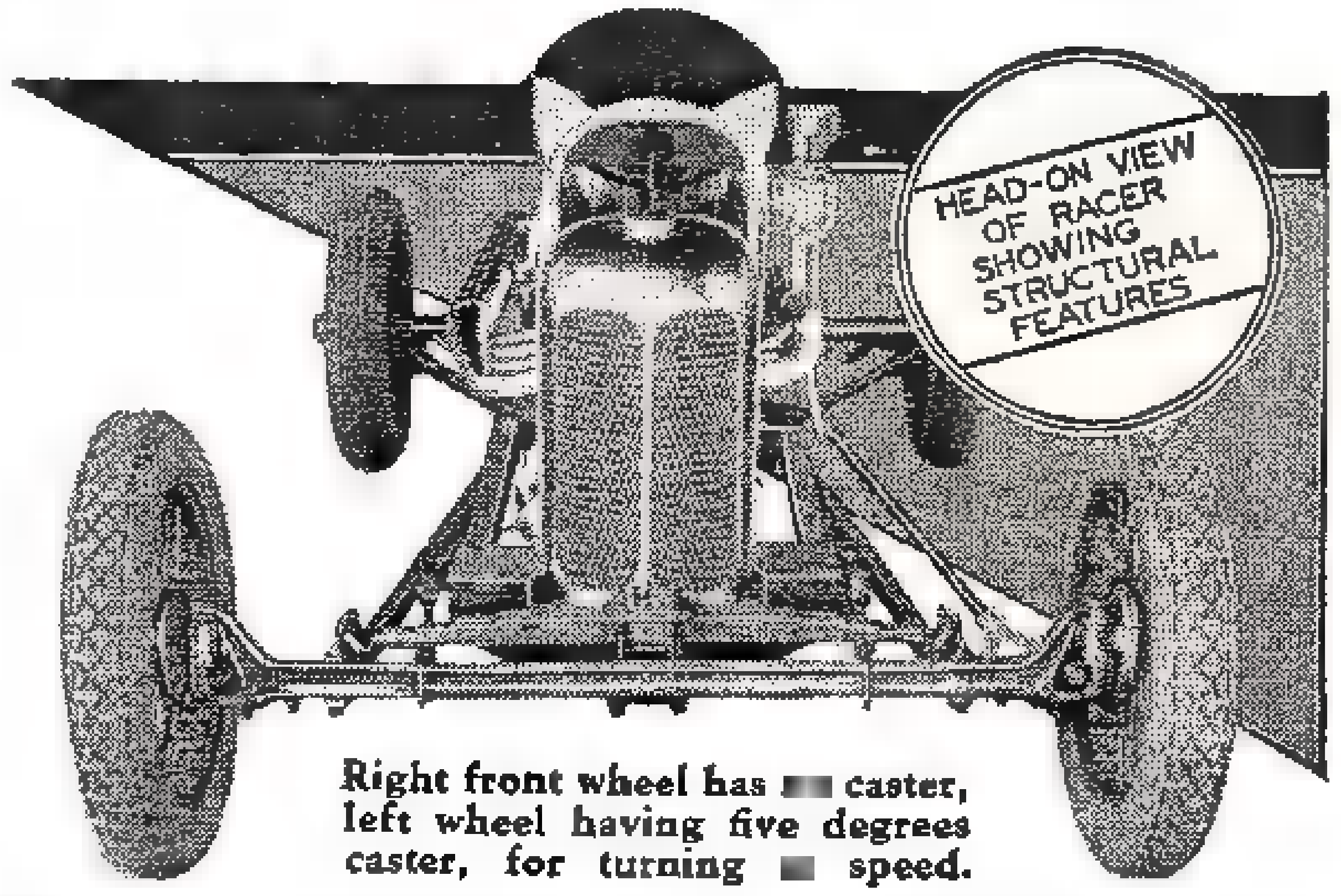
for Dirt Track Competition

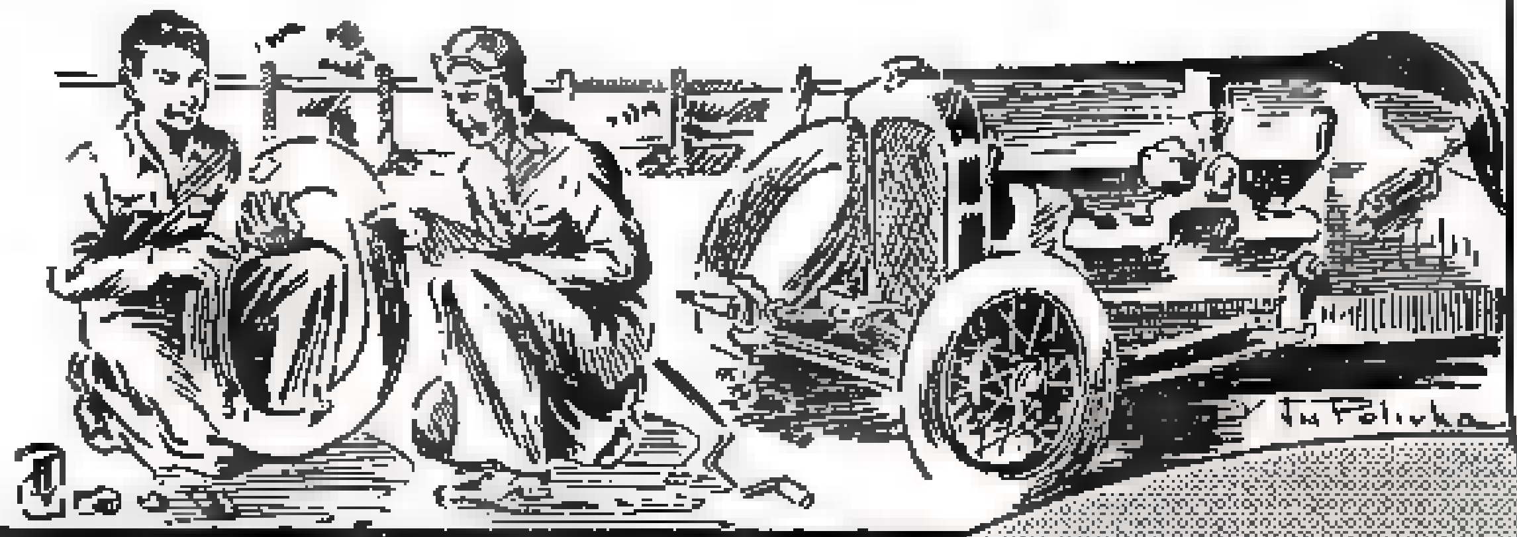
by RAY F. KUNS

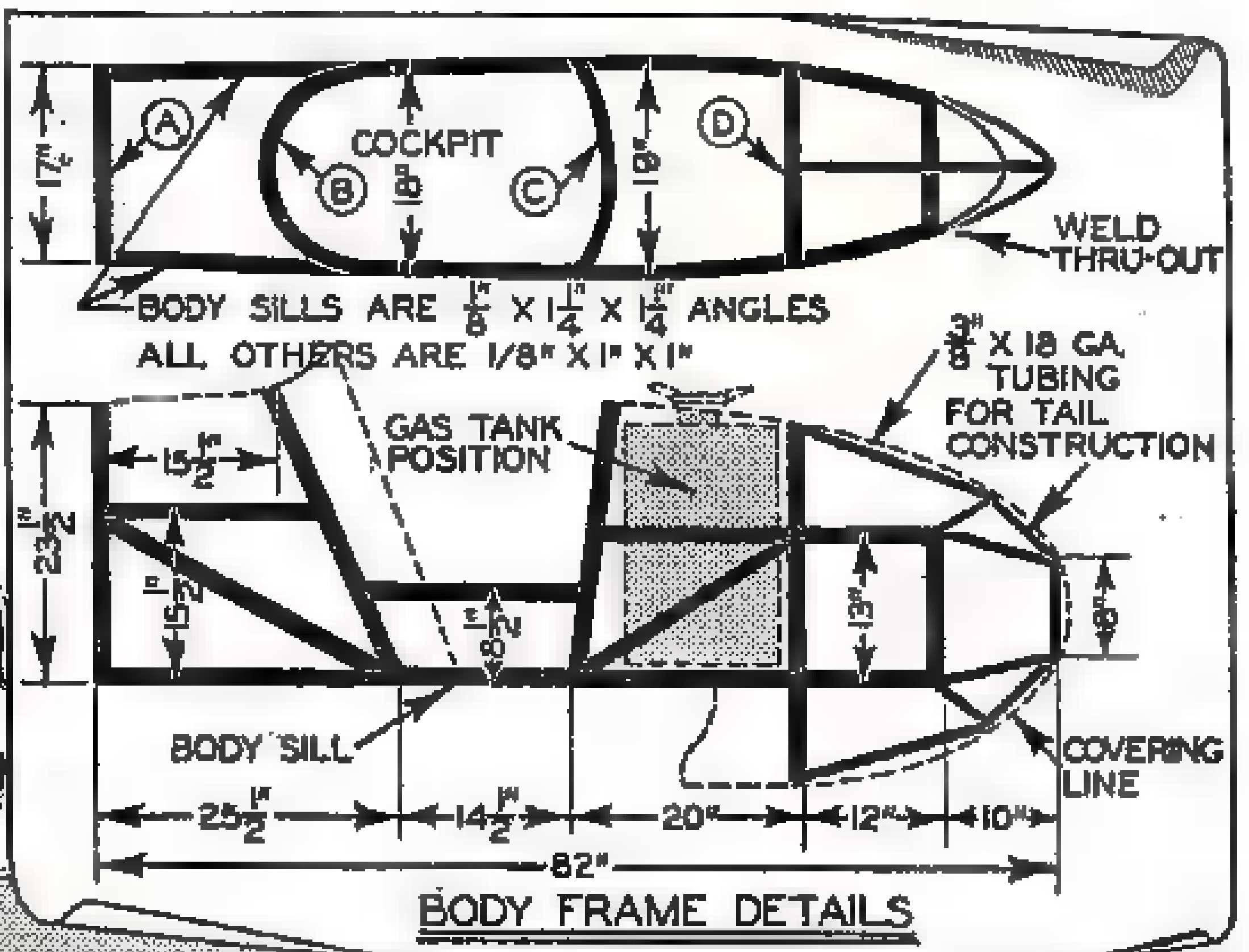
ALL the important features of design of the Don Campbell C-8 dirt track racing car, which gave a good account of itself on the dirt tracks during the last racing season, are illustrated in these drawings and photos. It will be noted that a standard tread of 56 inches is used, also that the wheelbase of the racer is 91 inches. In some instances the wheelbase is cut down to as low as 84 inches and in other cases it runs as high as 100 inches, for dirt track work.

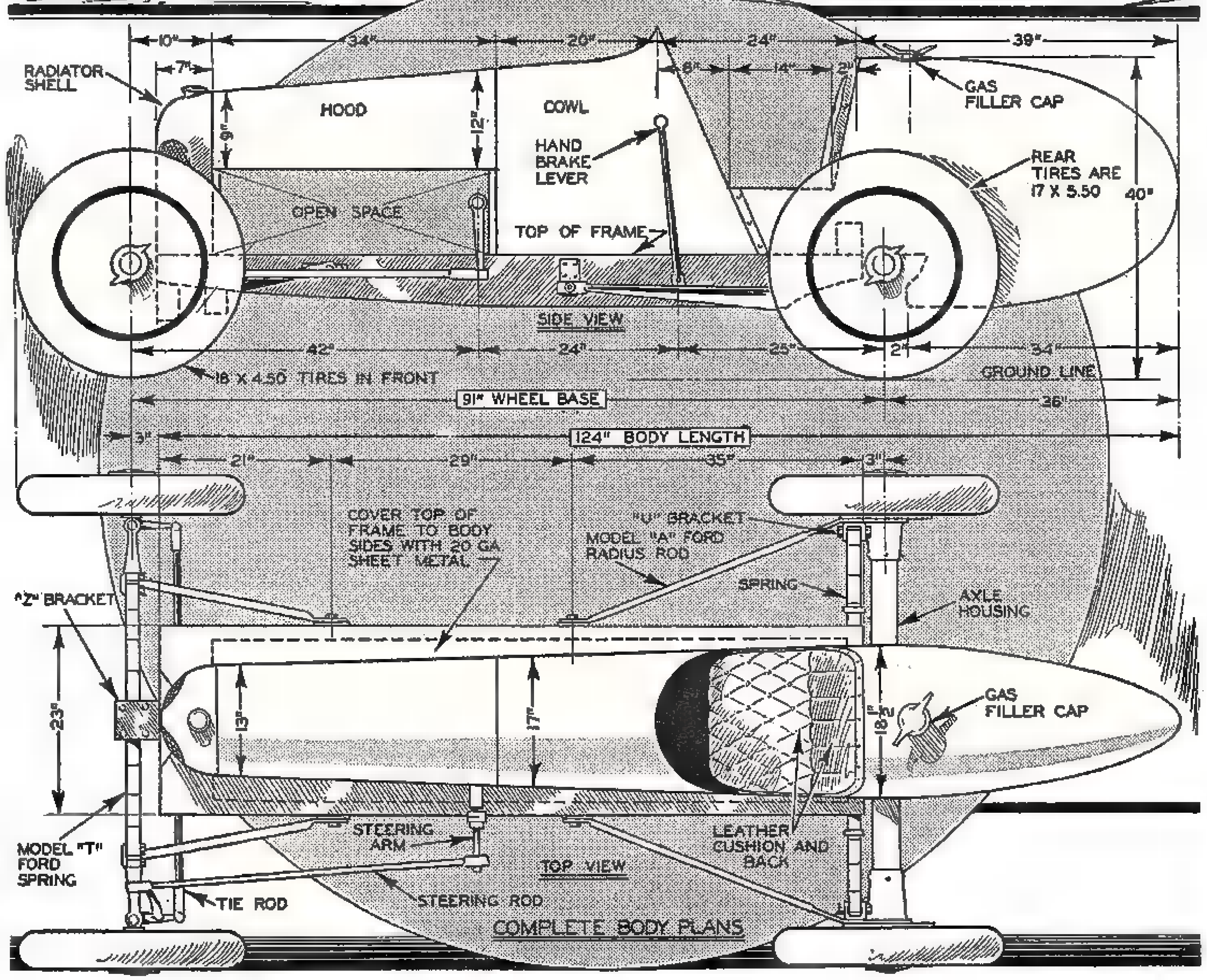
Note that the frame used under this racer is constructed from Model T Ford side members and cross members. Two front end cross members are mounted, one of them being designed to carry the front spring Z-bracket and the other designed as an engine mount; the engine mount being 6 inches back of the front spring mount. The side members are cut off at the rear end and fitted to the conventional Model T rear cross member, which is used to mount the rear spring. The projecting ends of the rear cross bracket are cut off. Special spring brackets are used which give an underslinging effect for the rear. The original width of the frame, that is, 23 inches, has been held to.

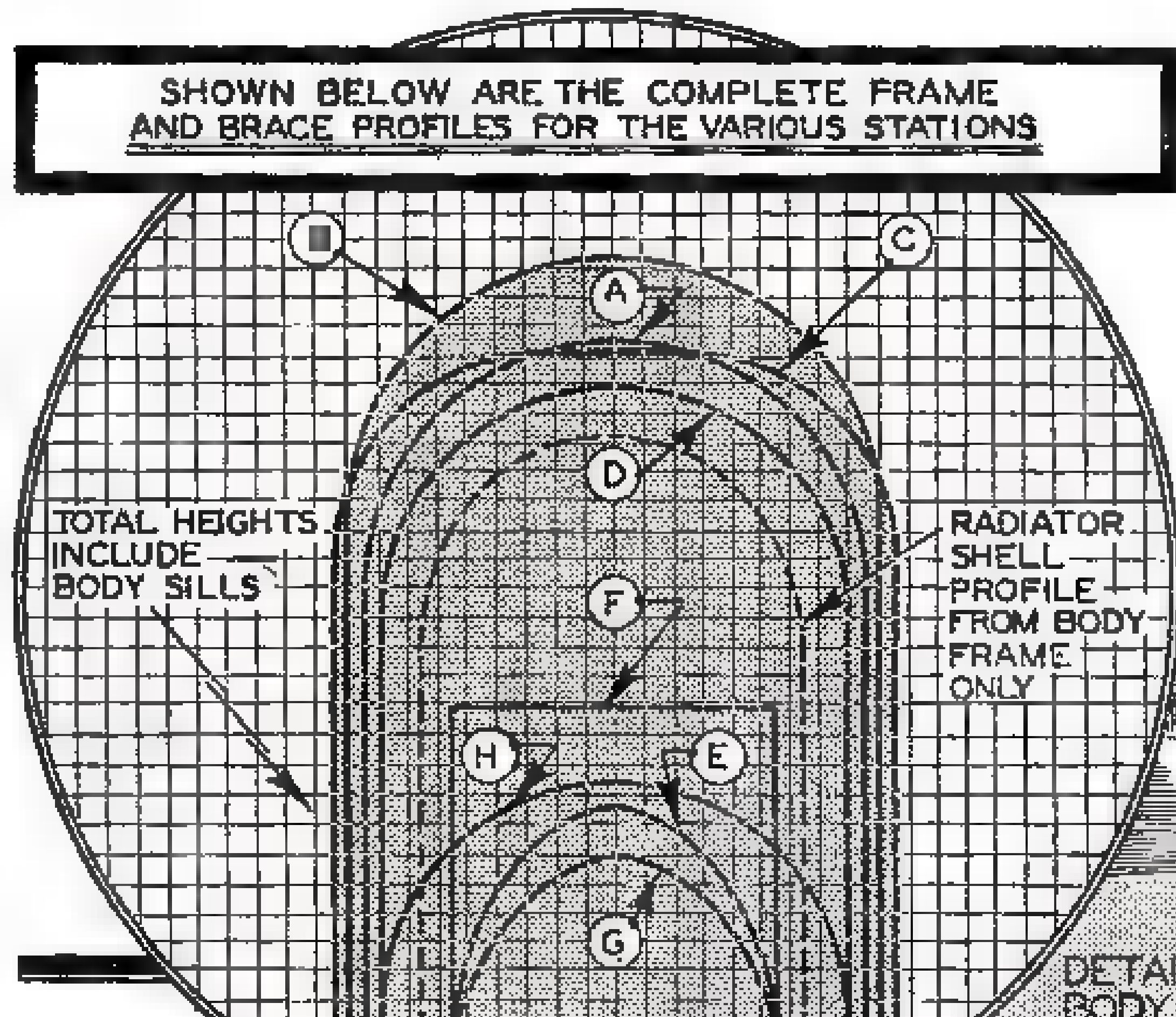
The weight of one of these dirt track racers should not exceed 1500 lbs., the one shown being approximately 1400 pounds. Owing to the fact that these cars are used on half-mile dirt tracks, it is necessary to give thought to their performance on this type of track. While the car must be low, it must not be too low or you will have what is known as a "floater." A floater is a car which tends to slip away from

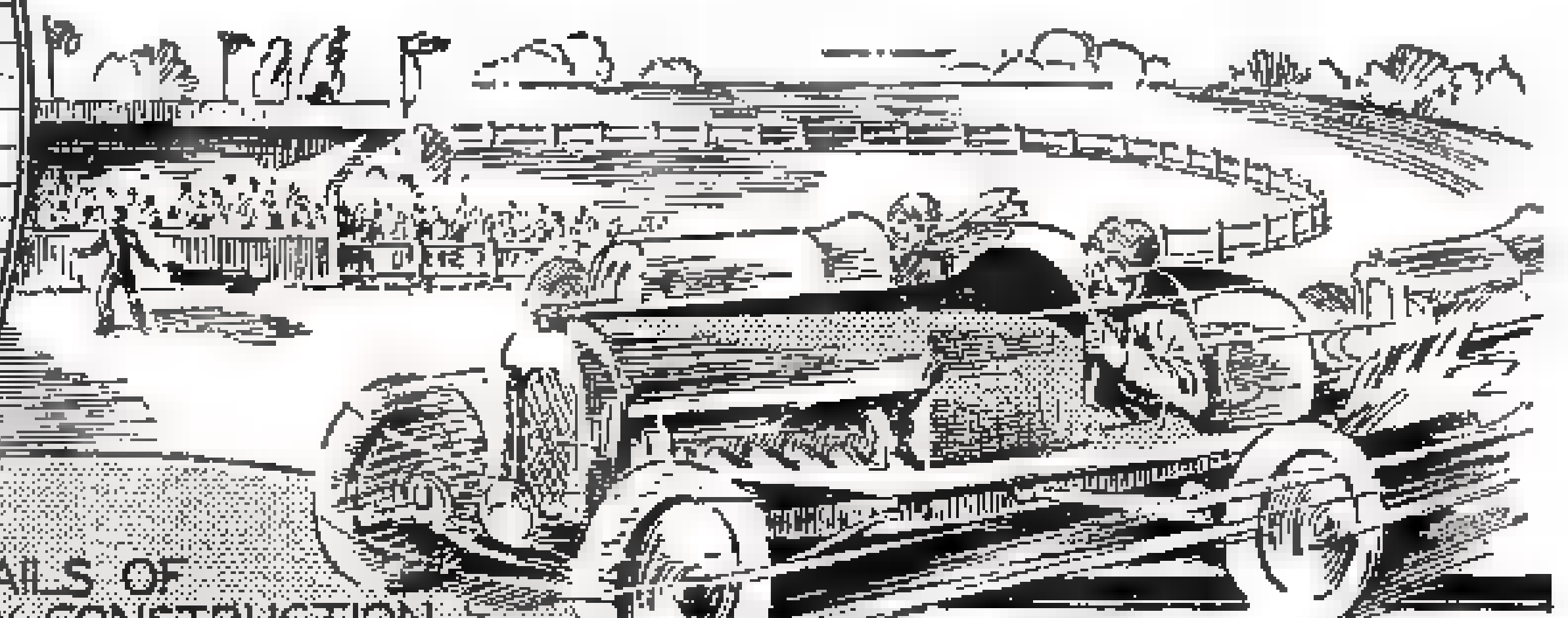

HEAD-ON VIEW OF RACER SHOWING STRUCTURAL FEATURES
Right front wheel has [redacted] caster, left wheel having five degrees caster, for turning [redacted] speed.

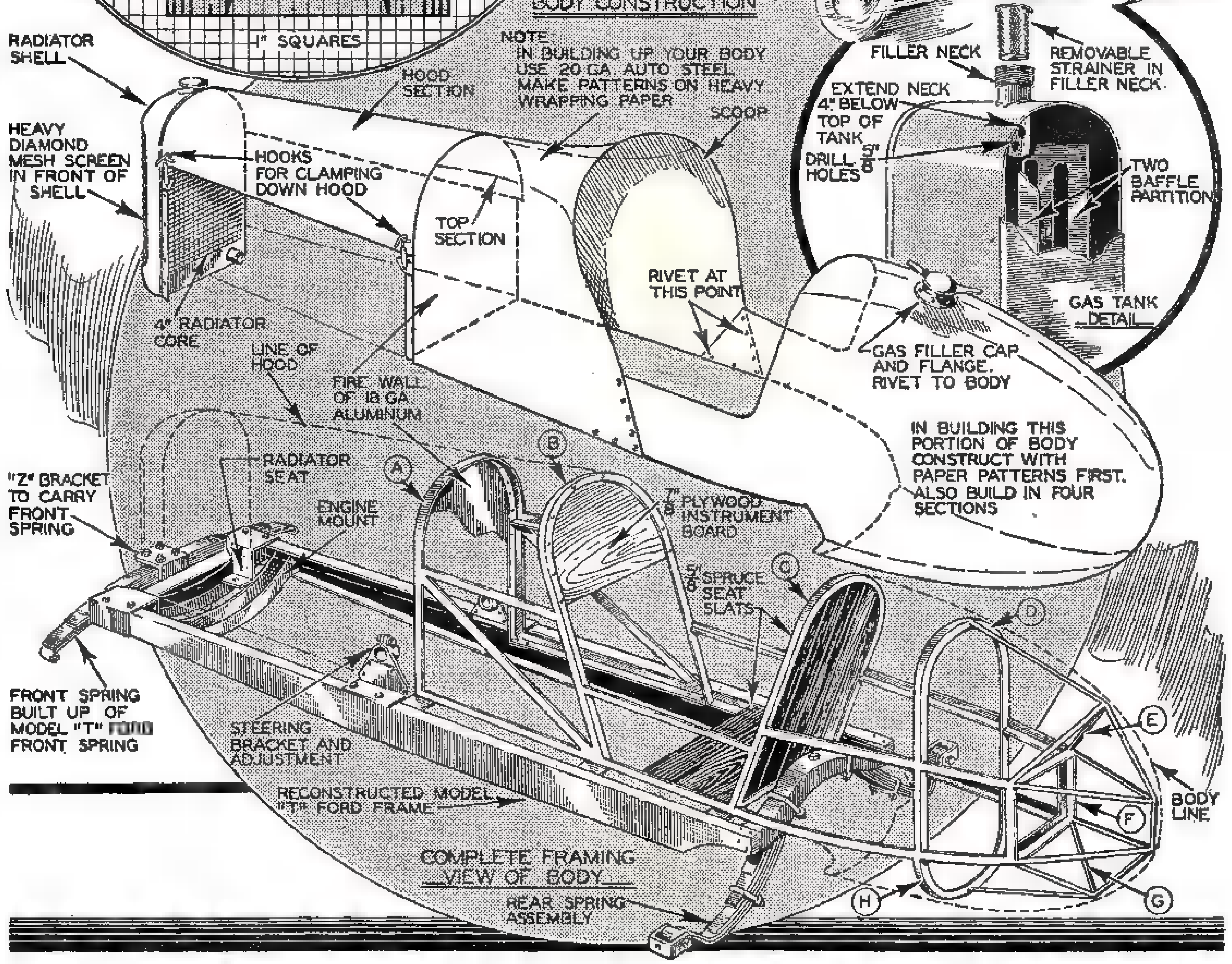



COCKPIT
A
B
C
D
17½"
18"
18"
WELD THRU-OUT
BODY SILLS ARE 1/8" X 1¼ X 1¼" ANGLES
ALL OTHERS ARE 1/8" X 1" X 1"
GAS TANK POSITION
3/8" X 18 GA. TUBING FOR TAIL CONSTRUCTION
15½"
23½"
15½"
8½"
13"
8"
BODY SILL
COVERING LINE
25½"
14½"
20"
12"
10"
82"
BODY FRAME DETAILS


RADIATOR SHELL
10"
7"
34"
20"
24"
6"
14"
2"
39"
HOOD
9"
12"
COWL
HAND BRAKE LEVER
GAS FILLER CAP
OPEN SPACE
TOP OF FRAME
REAR TIRES ARE 17 X 5.50
40"
SIDE VIEW
42"
24"
25"
2"
34"
18 X 4.50 TIRES IN FRONT
GROUND LINE
91" WHEEL BASE
36"
3"
124" BODY LENGTH
21"
29"
35"
3"
COVER TOP OF FRAME TO BODY SIDES WITH 20 GA SHEET METAL
"U" BRACKET
MODEL "A" FORD RADIUS ROD
SPRING
AXLE HOUSING
"Z" BRACKET
23"
13"
17"
18½"
GAS FILLER CAP
MODEL "T" FORD SPRING
STEERING ARM
LEATHER CUSHION AND BACK
TOP VIEW
TIE ROD
STEERING ROD
COMPLETE BODY PLANS


SHOWN BELOW ARE THE COMPLETE FRAME AND BRACE PROFILES FOR THE VARIOUS STATIONS
[redacted]
A
C
D
F
H
E
G
TOTAL HEIGHTS INCLUDE BODY SILLS
RADIATOR SHELL PROFILE FROM BODY FRAME ONLY
1" SQUARES
DETAILS OF BODY CONSTRUCTION




RADIATOR SHELL
HEAVY DIAMOND MESH SCREEN IN FRONT OF SHELL
HOOD SECTION
HOOKS FOR CLAMPING DOWN HOOD
TOP SECTION
SCOOP
4" RADIATOR CORE
LINE OF HOOD
FIRE WALL OF 18 GA ALUMINUM
RIVET AT THIS POINT
FILLER NECK
REMOVABLE STRAINER IN FILLER NECK.
EXTEND NECK 4" BELOW TOP OF TANK
DRILL 5/8" HOLES
TWO BAFFLE PARTITION
GAS TANK DETAIL
GAS FILLER CAP AND FLANGE. RIVET TO BODY
IN BUILDING THIS PORTION OF BODY CONSTRUCT WITH PAPER PATTERNS FIRST. ALSO BUILD IN FOUR SECTIONS
"Z" BRACKET TO CARRY FRONT SPRING
RADIATOR SEAT
ENGINE MOUNT
A
B
7/8" PLYWOOD INSTRUMENT BOARD
5/8" SPRUCE SEAT SLATS
C
D
E
F
G
H
BODY LINE
FRONT SPRING BUILT UP OF MODEL "T" [redacted] FRONT SPRING
STEERING BRACKET AND ADJUSTMENT
RECONSTRUCTED MODEL "T" FORD FRAME
REAR SPRING ASSEMBLY
NOTE: IN BUILDING UP YOUR BODY USE 20 GA. AUTO STEEL. MAKE PATTERNS ON HEAVY WRAPPING PAPER

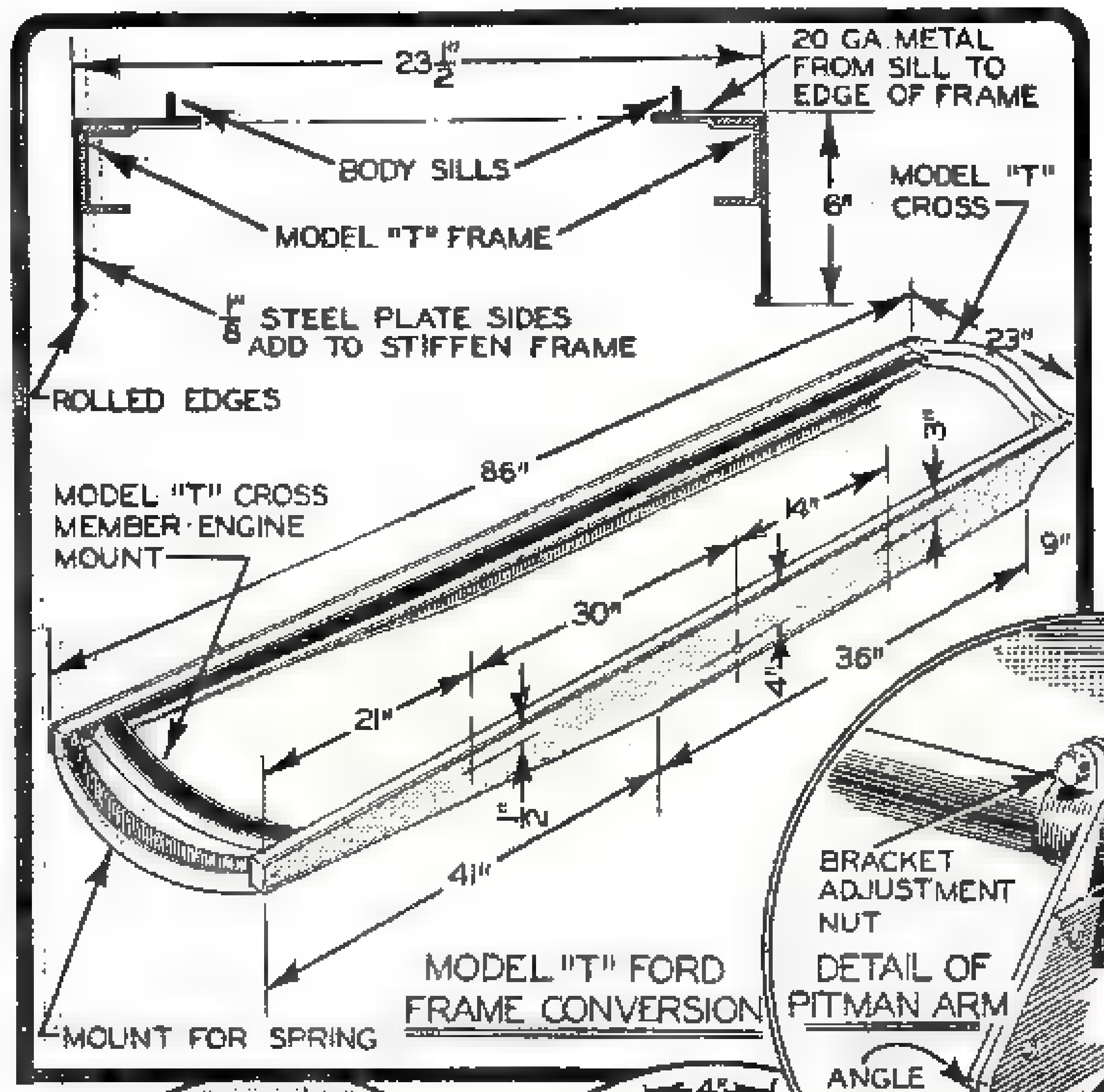
COMPLETE FRAMING VIEW OF BODY

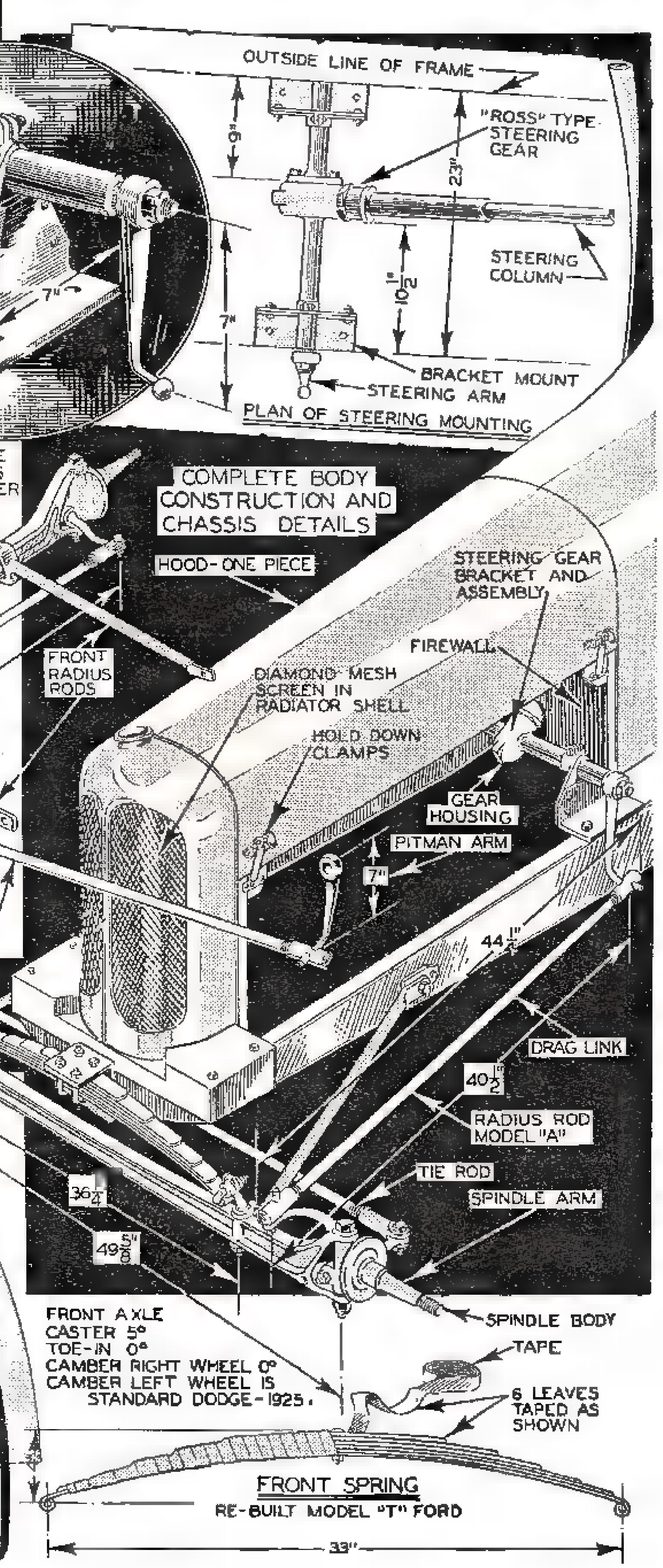
Details of Chassis Reinforcement, Spring Suspension Told by Drawings

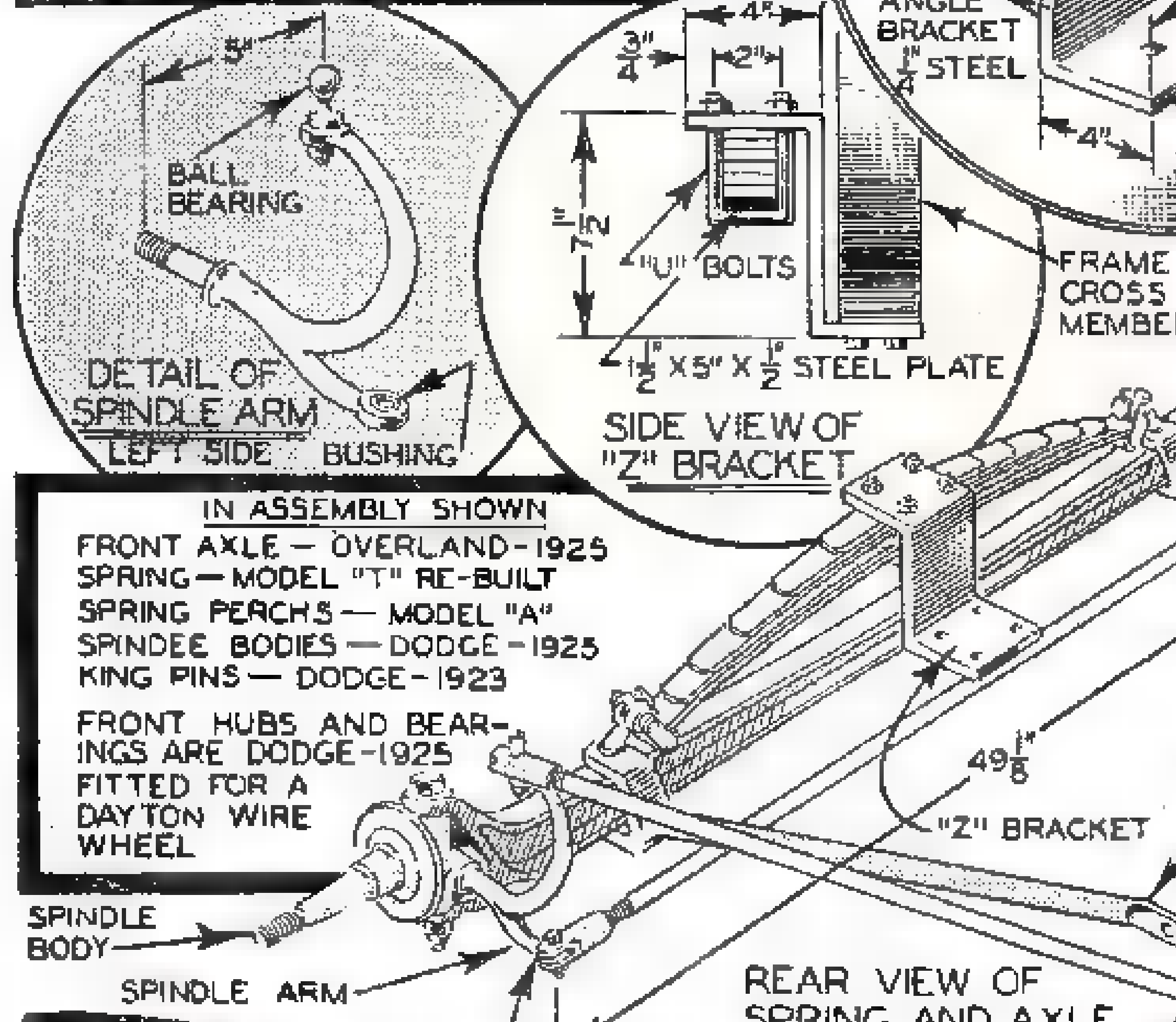
under you on the turns, much after the fashion of a stone skipped over the water. Too much weight on the front end of a racer used on dirt tracks is likely to cause the car to be carried out of its course, owing to improper distribution of load.

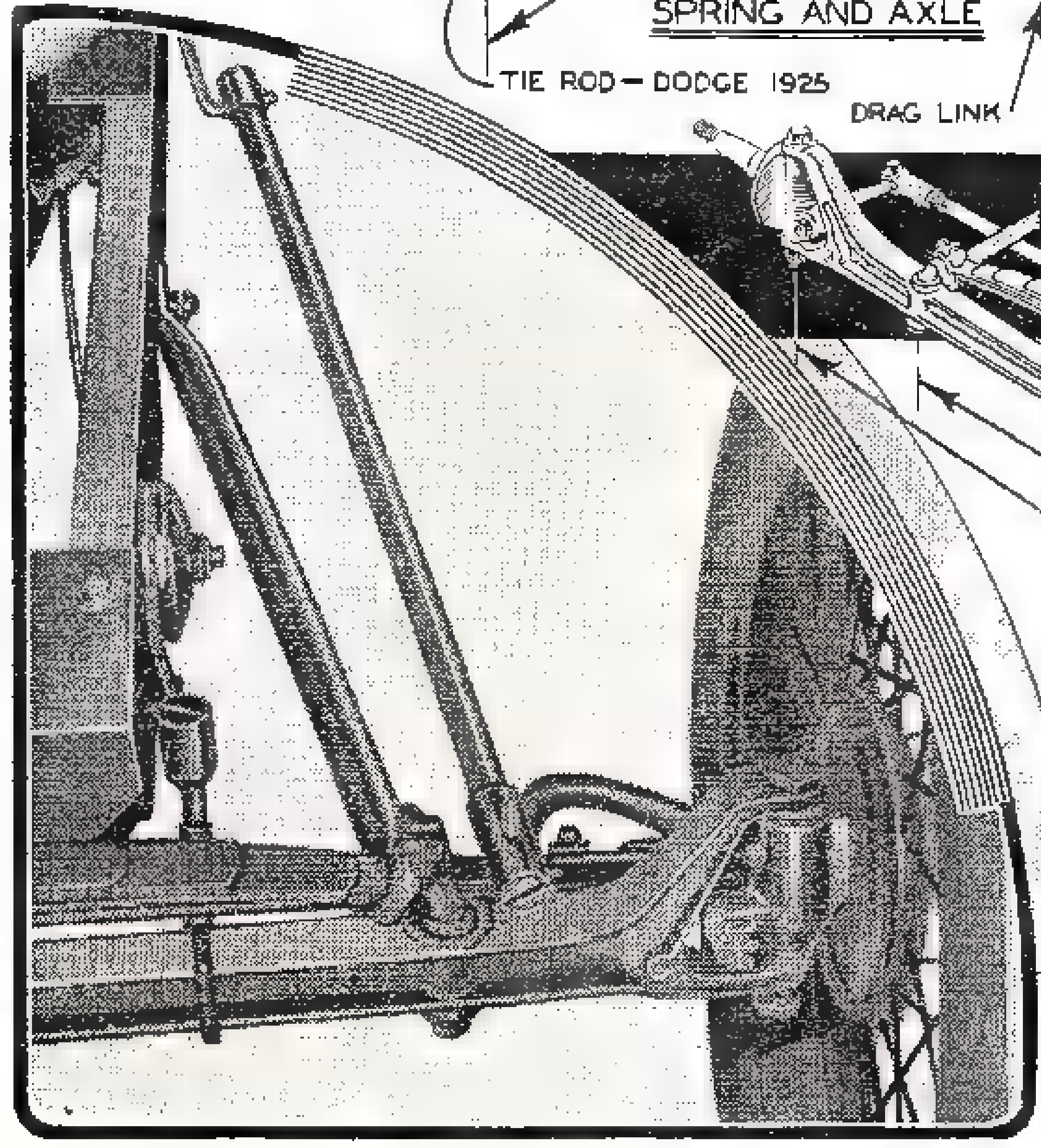
On the other hand, the engine can be set back too far. Six inches is recommended in this design to give proper balance. This car performs very well on the curves of the dirt tracks, showing that balance or distribution of weight is about right. It has a record of 24.2 seconds for the Cincinnati-Hamilton half-mile track and 23.4 seconds for the Winchester, Indiana track. The ability to get around the track in record-making time is a question of car balance. No matter how skilled the driver, the car must "handle." The chassis of the C-8 will take any of the lighter four-cylinder engines; in fact, has had several different engines in it.

The front axle beam is a 1925 Overland four. It will be remembered this axle made use of spring perches similar to the Model T and A Fords. Perches used in this case are Model A Ford. The spring itself is a Model T Ford, flattened out. It is necessary


23 1/2"
20 GA. METAL FROM SILL TO EDGE OF FRAME
BODY SILLS
MODEL "T" FRAME
6"
MODEL "T" CROSS
1/8" STEEL PLATE SIDES ADD TO STIFFEN FRAME
23"
ROLLED EDGES
86"
3"
MODEL "T" CROSS MEMBER ENGINE MOUNT
14"
9"
30"
36"
4"
21"
1 1/2"
41"
MOUNT FOR SPRING
MODEL "T" FORD FRAME CONVERSION

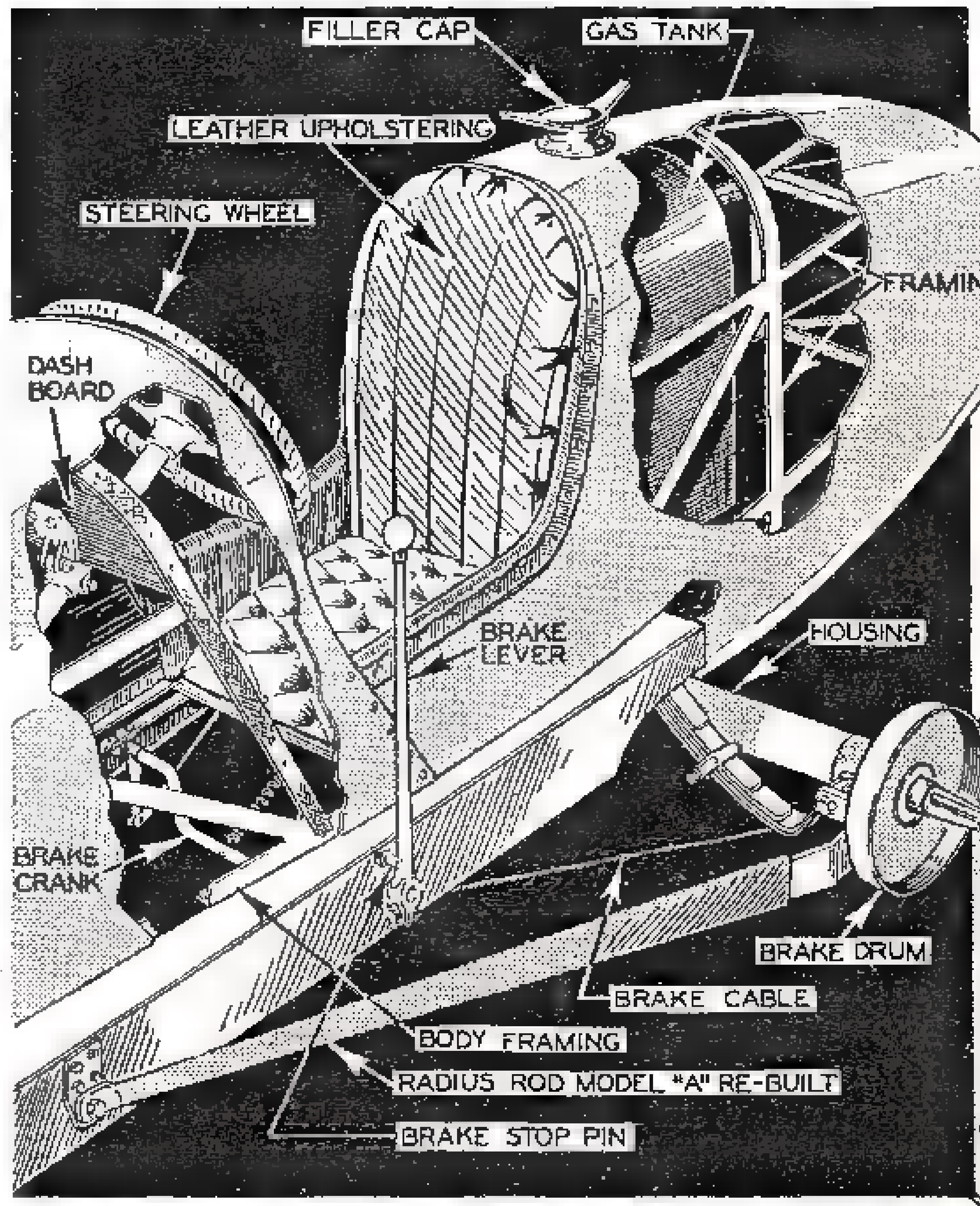

BRACKET ADJUSTMENT NUT
DETAIL OF PITMAN ARM
ANGLE BRACKET 1/4" STEEL
7"
4"
OUTSIDE LINE OF FRAME
"ROSS" TYPE STEERING GEAR
9"
23"
STEERING COLUMN
10 1/2"
7"
BRACKET MOUNT
STEERING ARM
PLAN OF STEERING MOUNTING
COMPLETE BODY CONSTRUCTION AND CHASSIS DETAILS
HOOD-ONE PIECE
STEERING GEAR BRACKET AND ASSEMBLY
FIREWALL
FRONT RADIUS RODS
DIAMOND MESH SCREEN IN RADIATOR SHELL
HOLD DOWN CLAMPS
GEAR HOUSING
PITMAN ARM
7"
44 1/4"
DRAG LINK
40 1/2"
RADIUS ROD MODEL "A"
TIE ROD
SPINDLE ARM
36 1/4
49 5/8"
SPINDLE BODY
FRONT AXLE
CASTER 5°
TOE-IN 0°
CAMBER RIGHT WHEEL 0°
CAMBER LEFT WHEEL IS STANDARD DODGE-1925.
TAPE
6 LEAVES TAPED AS SHOWN
FRONT SPRING
RE-BUILT MODEL "T" FORD
33"


5"
BALL BEARING
DETAIL OF SPINDLE ARM
LEFT SIDE
BUSHING
3/4"
4"
2"
7 1/2"
"U" BOLTS
1 1/2" X 5" X 1/2" STEEL PLATE
FRAME CROSS MEMBER
SIDE VIEW OF "Z" BRACKET
IN ASSEMBLY SHOWN
FRONT AXLE — OVERLAND-1925
SPRING — MODEL "T" RE-BUILT
SPRING PERCHS — MODEL "A"
SPINDEE BODIES — DODGE-1925
KING PINS — DODGE-1923
FRONT HUBS AND BEARINGS ARE DODGE-1925 FITTED FOR A DAYTON WIRE WHEEL
SPINDLE BODY
SPINDLE ARM
49 1/8"
"Z" BRACKET
REAR VIEW OF SPRING AND AXLE
TIE ROD — DODGE 1925
DRAG LINK

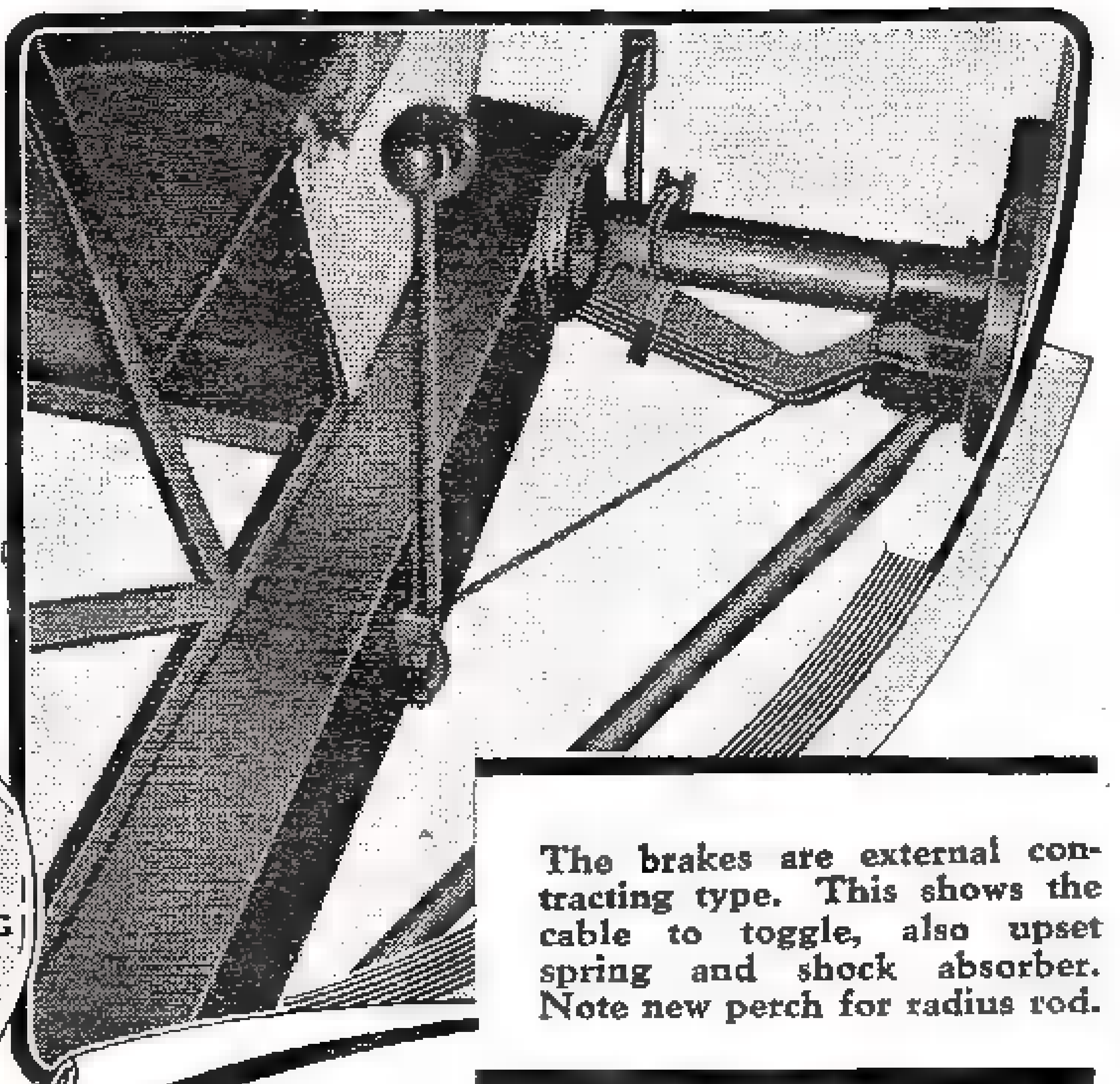


The tie-rod and radius rod hook-ups are shown in the photo immediately above. Front spring suspension, spindle arm details, and method of stiffening frame are shown in the drawings. Note the taped front spring, which is rebuilt.

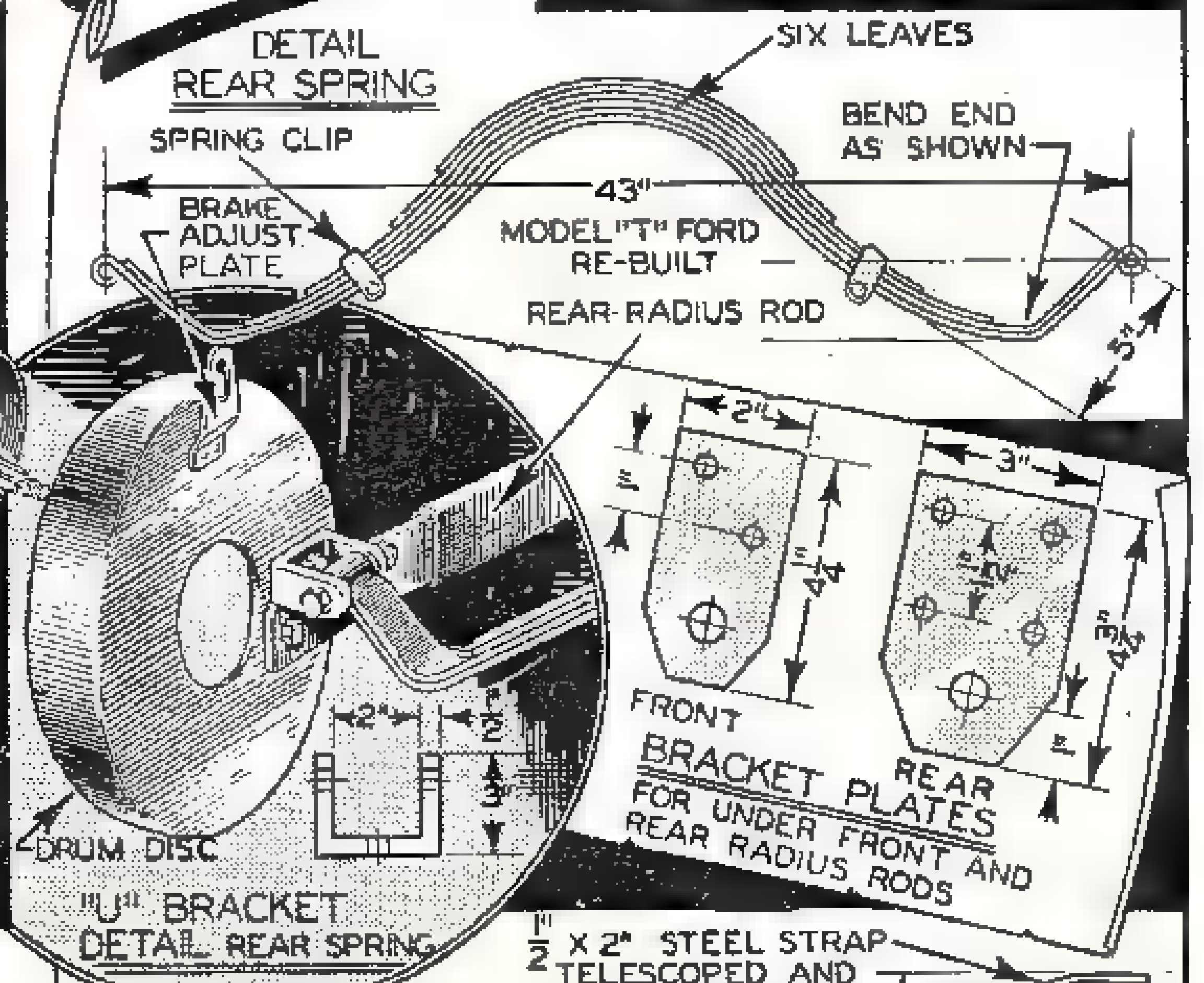
Mounting of Radius Rods, Brake Cables Done With Eye to Accessibility

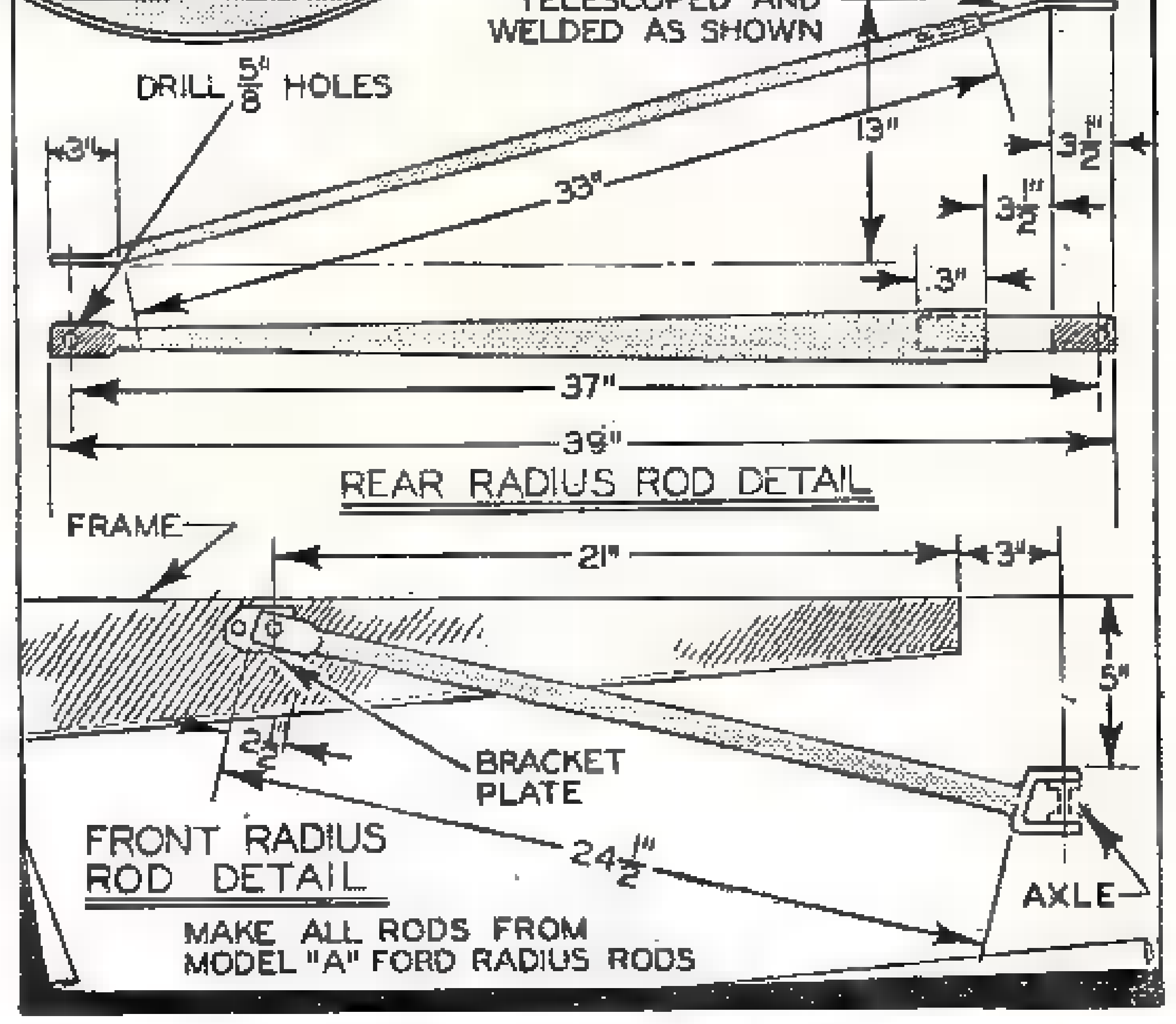

FILLER CAP
GAS TANK
LEATHER UPHOLSTERING
STEERING WHEEL
FRAMING
DASH BOARD
BRAKE LEVER
HOUSING
BRAKE CRANK
BRAKE DRUM
BRAKE CABLE
BODY FRAMING
RADIUS ROD MODEL "A" RE-BUILT
BRAKE STOP PIN

Immediately above is shown the disposition of the gas tank, seat and brake lever cross arm. To the right is shown rebuilt "T" Ford rear spring, new perch and drum disc.

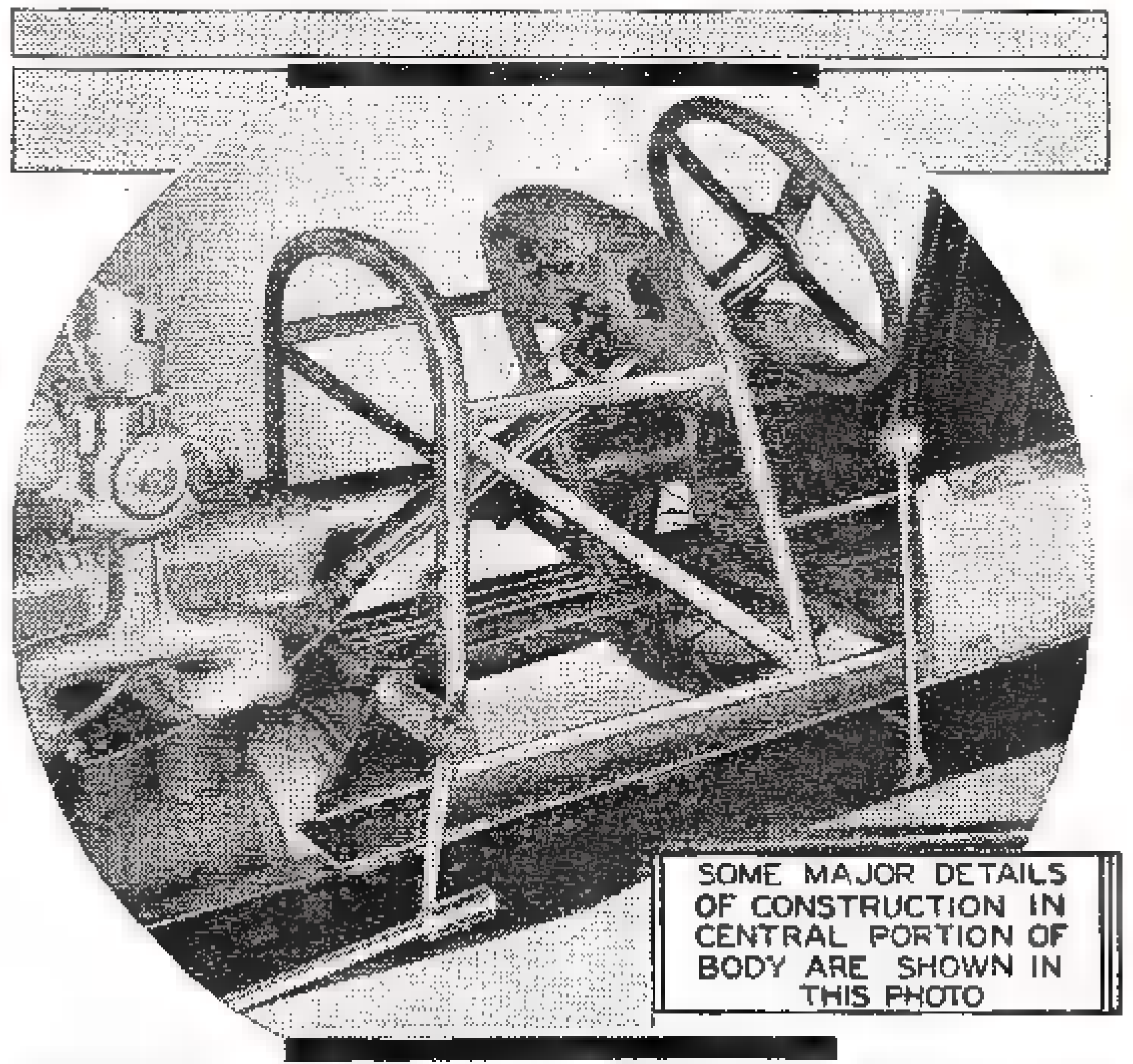


The brakes are external contracting type. This shows the cable to toggle, also upset spring and shock absorber. Note new perch for radius rod.


DETAIL REAR SPRING
SIX LEAVES
SPRING CLIP
BEND END AS SHOWN
43"
BRAKE ADJUST PLATE
MODEL "T" FORD RE-BUILT
REAR-RADIUS ROD
5"
2"
1"
4 1/4"
3"
1/2"
4 1/2"
3 1/2"
1"
FRONT
REAR
BRACKET PLATES
FOR UNDER FRONT AND REAR RADIUS RODS
2"
1/2"
3"
DRUM DISC
"U" BRACKET DETAIL REAR SPRING


1/2" X 2" STEEL STRAP TELESCOPED AND WELDED AS SHOWN
DRILL 5/8" HOLES
3"
13"
33"
3 1/2"
3 1/2"
3"
37"
39"
REAR RADIUS ROD DETAIL
FRAME
21"
3"
5"
2 1/2"
BRACKET PLATE
24 1/2"
AXLE
FRONT RADIUS ROD DETAIL
MAKE ALL RODS FROM MODEL "A" FORD RADIUS RODS

Immediately above are shown the dimensions of the front and rear radius rod installations. These are all made from Ford model "A" radius rods.


SOME MAJOR DETAILS OF CONSTRUCTION IN CENTRAL PORTION OF BODY ARE SHOWN IN THIS PHOTO

The steering wheel is set just off the center line, as shown above and in the top right drawing, opposite page. The placing of Pitman rod and body frames is also shown here.

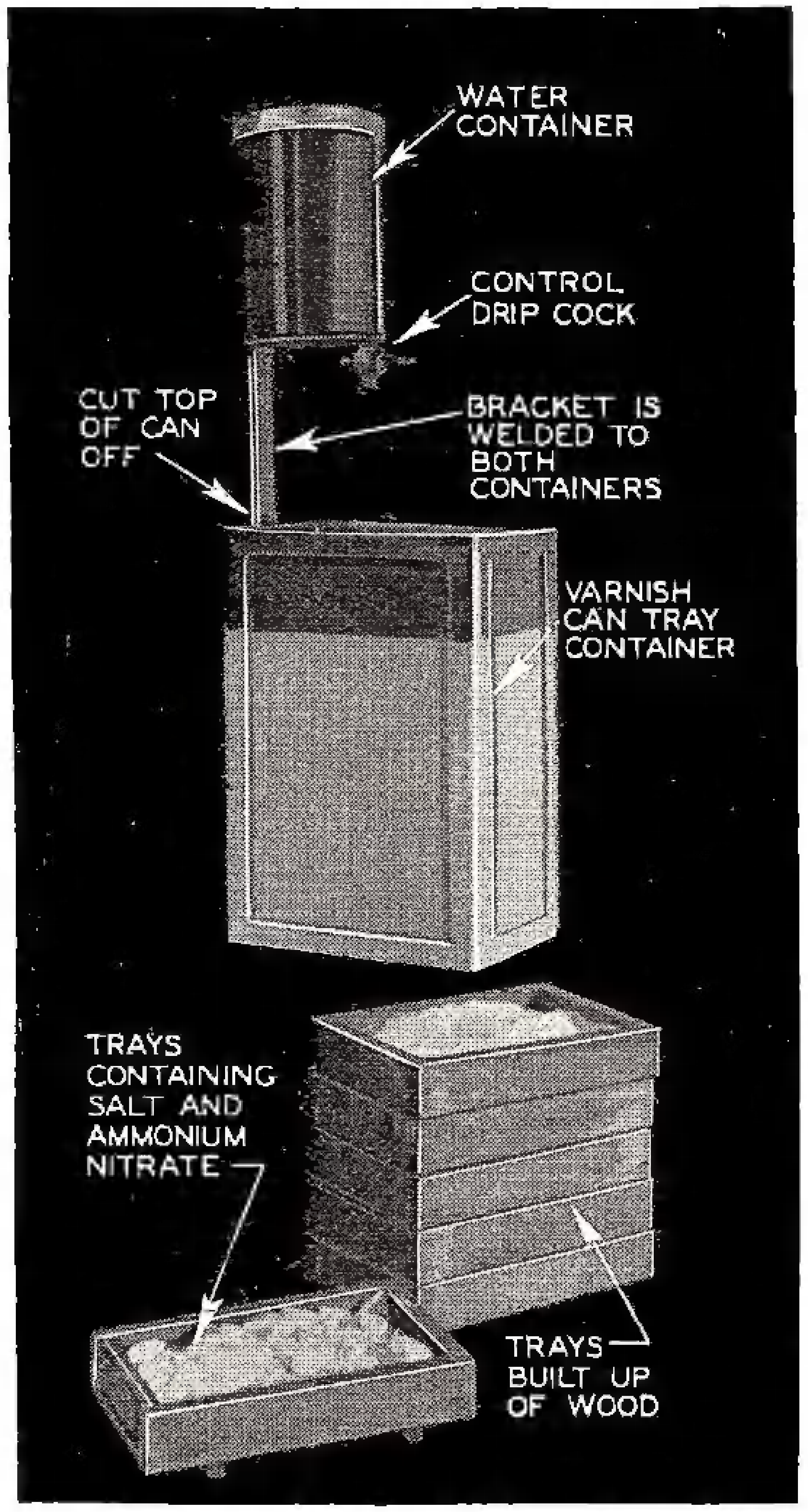
HOW to BUILD a Simple Chemical REFRIGERATOR

Here's an old schoolroom favorite—the cooler you used to see in physics class has been put to a practical experimental use by Mr. Cartright who shows how to build one of these simple affairs.

by JOHN CARTRIGHT

ICE boxes cool food because ice absorbs heat. As the ice melts, heat is required to raise its temperature to 32° F., the melting point.

If we build a box and insulate it from the heat of outside air currents, place ice in the box, and then place food in along with it to furnish heat to melt the ice, a balance is soon struck between the melting point of ice, which is always 32° F. and the temperature in the rest of the box. Generally this is around 50° F. We make provision to drain off the water from the ice tray, and presto, we have an ice box.


WATER CONTAINER
CONTROL DRIP COCK
CUT TOP OF CAN OFF
BRACKET IS WELDED TO BOTH CONTAINERS
VARNISH CAN TRAY CONTAINER
TRAYS CONTAINING SALT AND AMMONIUM NITRATE
TRAYS BUILT UP OF WOOD

A couple of cans, some trays impregnated with paraffin, and a supply of common salt mixed with ammonium nitrate constitute a fine ice box cooler for the summer camp.

Usually we think of the function of the ice box in reverse order. We think that we put food in to cool. But this is not so: there are several variations of the idea, looking at it from the standpoint of pure schoolroom physics.

For instance, there are machines which will cool an ice box quite as effectively as ice itself.

They work in somewhat the same fashion as ice. All of them are devices which allow gases to expand in "cooling coils." This expansion in the coils is accompanied by a much lowered temperature in the gas. Consequently the gas tends to soak up heat from the surrounding air, which in turn soaks up heat from the food in the box. As the gas travels through the coils it becomes warmed by the heat it has picked up, and it is carried (in mechanical types of refrigerators) to a compressor which squeezes the gas down again in volume. This also compresses the heat to a small space, and the gas is run through a cooling coil outside the refrigerator through which a blast of air is run by a fan to get rid of the heat. Then the gas is passed to a reservoir waiting to be admitted to the expansion coil again.

It is on the above principle that Frigidaire, G-E, and other mechanical refrigerators work.

Principles of Refrigeration

Chemical, gas, or absorption machines as they are called, do the compressing chemically, or by absorption of the gas into charcoal or other absorbent. While they need no pumps, there is a difference in pressures in the gases in the refrigerating system, and all such types must be of the sealed variety. That is, the refrigerating gas is sealed hermetically with the exclusion of air in a closed system of circulating pipes.

Both ice itself and these mechanical refrigerating machines operate on the same principle in an ice box. They soak up heat from the surrounding air and food. If we place food near them in a circulating space closed to outside air such as an ice box, we get an inverse result which is commonly thought of as the cooling of food. What really happens is the heating of the ice or the coil—a transfer which leaves the food in a lowered temperature.

There is still a third way for obtaining lowered temperature within an ice box that is ideally suited to the needs of the camper, the motorist or the summer resorter who is out of touch with the supply of ice.

This method is known as evaporative refrigeration, and I am going to tell you how to build a refrigerating unit that needs no motors, needs no heating of a ball in a kerosene flame, and which needs no little gas pilot light to make it work. It is a refrigerator built on the old schoolroom chestnut—"heat of solution."

You know what happens when you put alcohol on your hand? Dries up right away, doesn't it? Feels cool too, eh? Or ether, which is even colder. Maybe you have seen canvas water bottles which cooled water because enough leaked through the bottle to keep the outside moist, and when the water evaporated it soaked up enough heat to leave the contents of the bottle cool.

Cooling by Evaporation

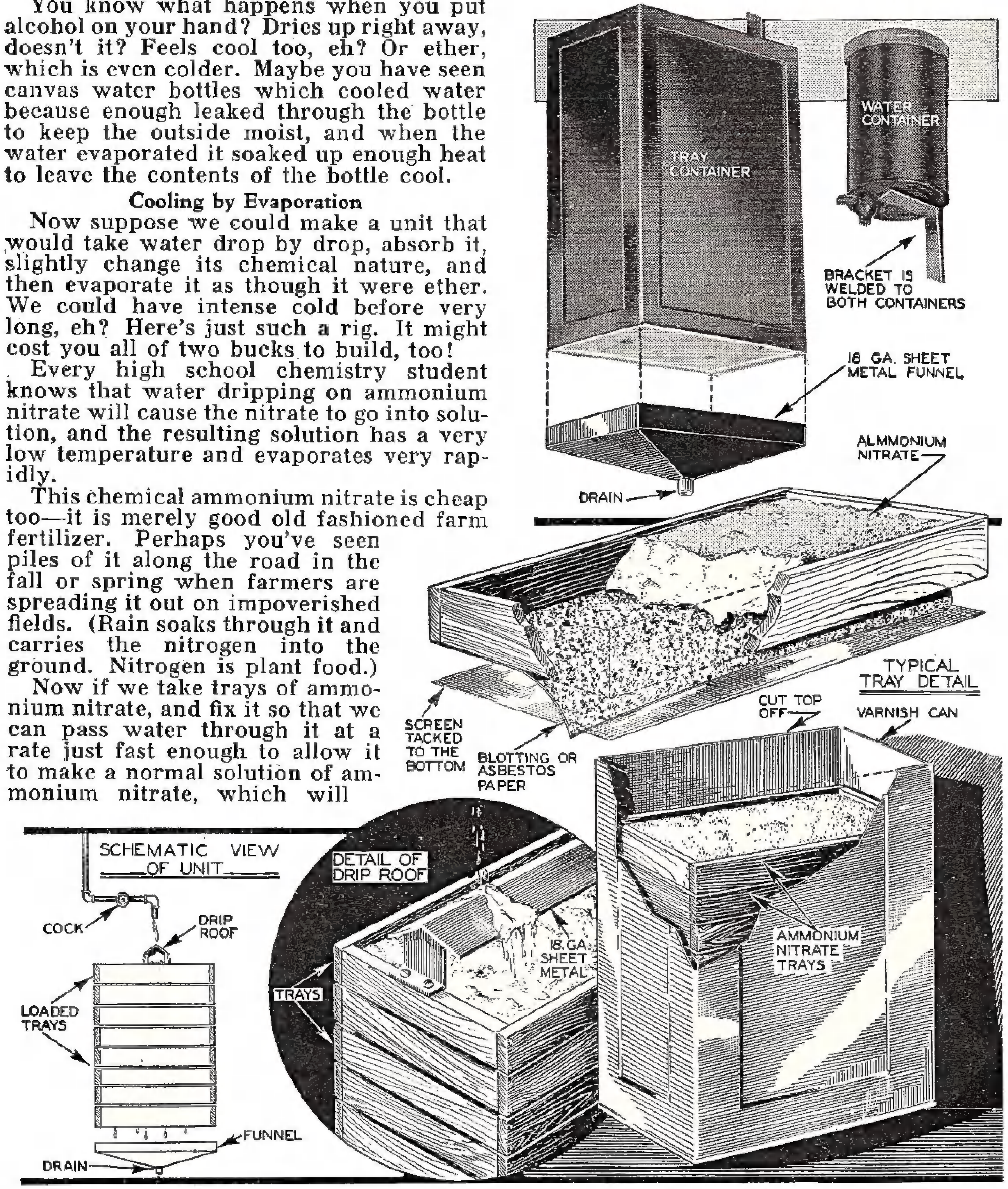
Now suppose we could make a unit that would take water drop by drop, absorb it, slightly change its chemical nature, and then evaporate it as though it were ether. We could have intense cold before very long, eh? Here's just such a rig. It might cost you all of two bucks to build, too!

Every high school chemistry student knows that water dripping on ammonium nitrate will cause the nitrate to go into solution, and the resulting solution has a very low temperature and evaporates very rapidly.

This chemical ammonium nitrate is cheap too—it is merely good old fashioned farm fertilizer. Perhaps you've seen piles of it along the road in the fall or spring when farmers are spreading it out on impoverished fields. (Rain soaks through it and carries the nitrogen into the ground. Nitrogen is plant food.)

Now if we take trays of ammonium nitrate, and fix it so that we can pass water through it at a rate just fast enough to allow it to make a normal solution of ammonium nitrate, which will immediately become cold, and then put in something which will keep the nitrate from crystallizing as it evaporates, we can put these trays in a metal box, arrange a drain, and have something nearly as good as a

(Continued on page 129)



The drain must be used to pipe off the solution which results when the water drips onto the ammonium nitrate. A drip cock trickling water on a tin roof evenly distributes the water through the top tray, whence it filters to the others.

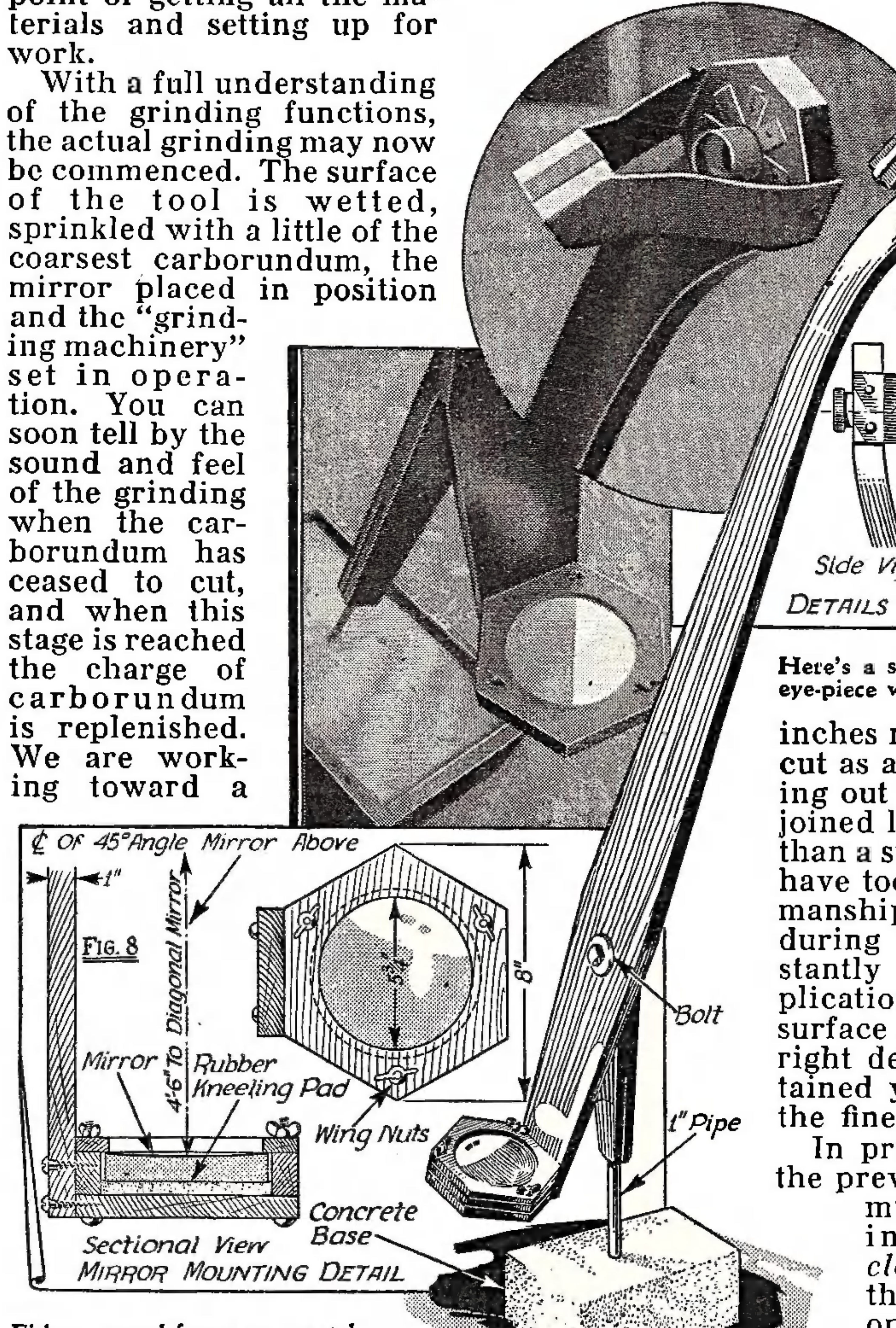
Building a TELESCOPE for "STAR GAZING"—Part II

by E. WILLARD. PENNINGTON

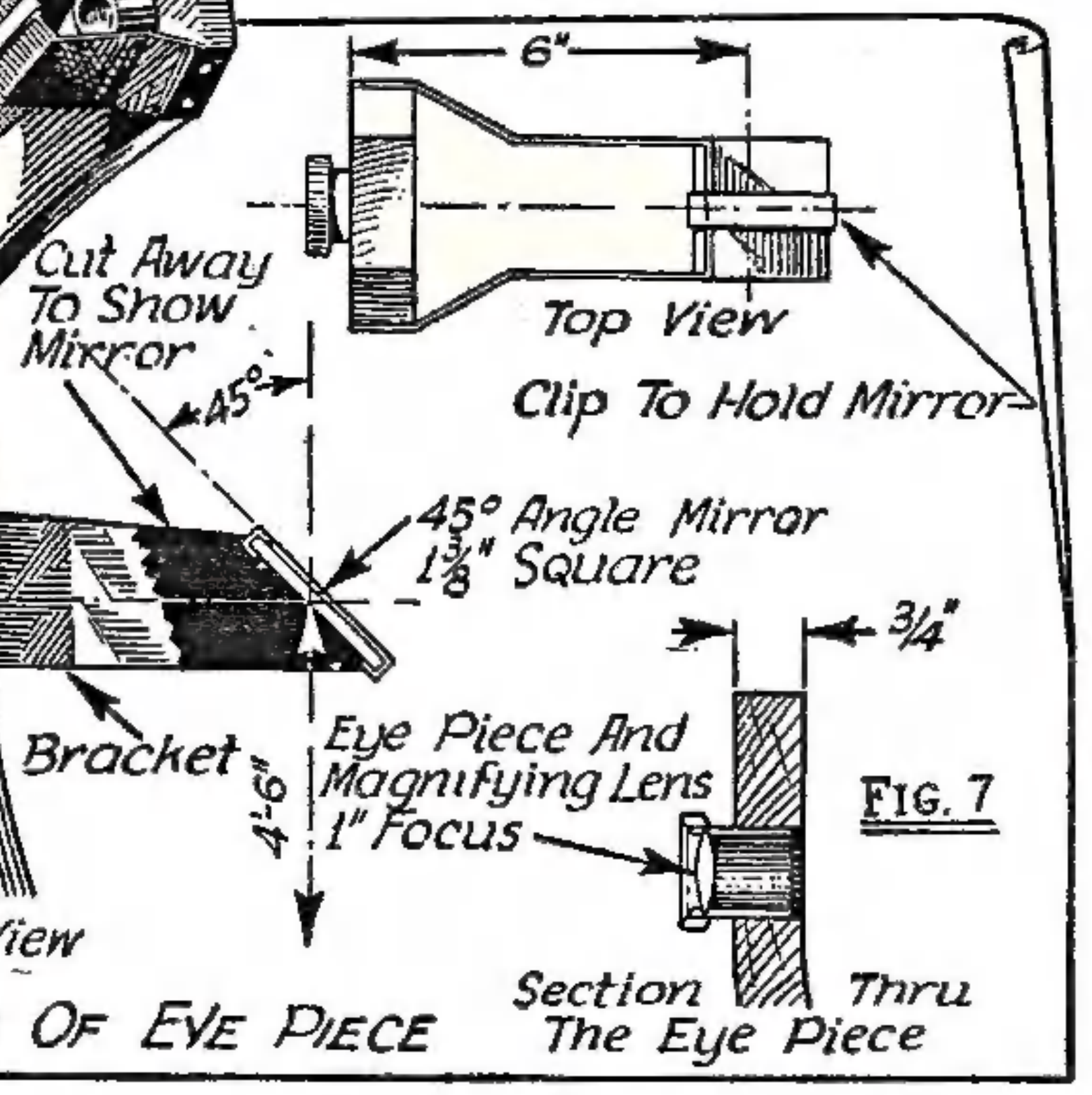
In this article Mr. Pennington shows how to polish and mount the mirror for which grinding directions were given last issue. Also the simple Foucault test is thoroughly explained so you can have a mirror as accurate as the finest.

WE ARE describing the construction of reflecting telescopes, with particular emphasis on a 6" telescope which one can build himself. In the last issue we described the optical system, showed a frame, described the grinding of the lens up to the point of getting all the materials and setting up for work.

With a full understanding of the grinding functions, the actual grinding may now be commenced. The surface of the tool is wetted, sprinkled with a little of the coarsest carborundum, the mirror placed in position and the "grinding machinery" set in operation. You can soon tell by the sound and feel of the grinding when the carborundum has ceased to cut, and when this stage is reached the charge of carborundum is replenished. We are working toward a spherical reflector having a focal length of 50 inches and such a reflector has a *spherical radius* or center of curvature of 100 inches so in order to check the progress of the rough grinding it is necessary to provide a thin metal template a little longer than the diameter of the mirror and having one edge cut accurately along an arc of 100 inches radius. This template should be cut as accurately as possible, so in laying out its curve use a wood batten or joined laths for making the arc, rather than a string or cord as the latter would have too much stretch for exact workmanship. If the mirror tends to stick during the grinding process stop instantly and add water. When the application of the template to the washed surface of the mirror indicates that the right degree of curvature has been attained you are ready to proceed with the fine grinding.



Either a wood frame or a metal pipe frame (as shown last issue) can be used to hold the mirror and the eye-piece of the simple reflecting type telescope. Above is shown the method of mounting the mirror on a rubber sponge.

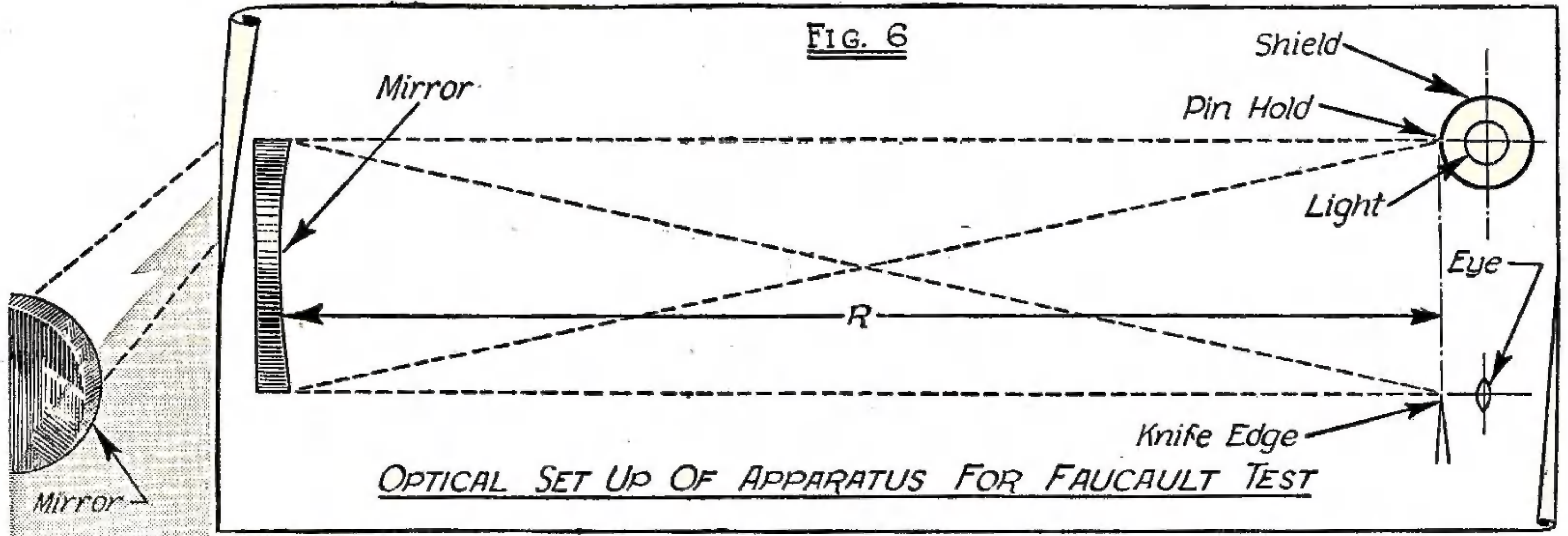


Here's a simple brass frame for the 1" focal length eye-piece which catches the image reflected in mirror.

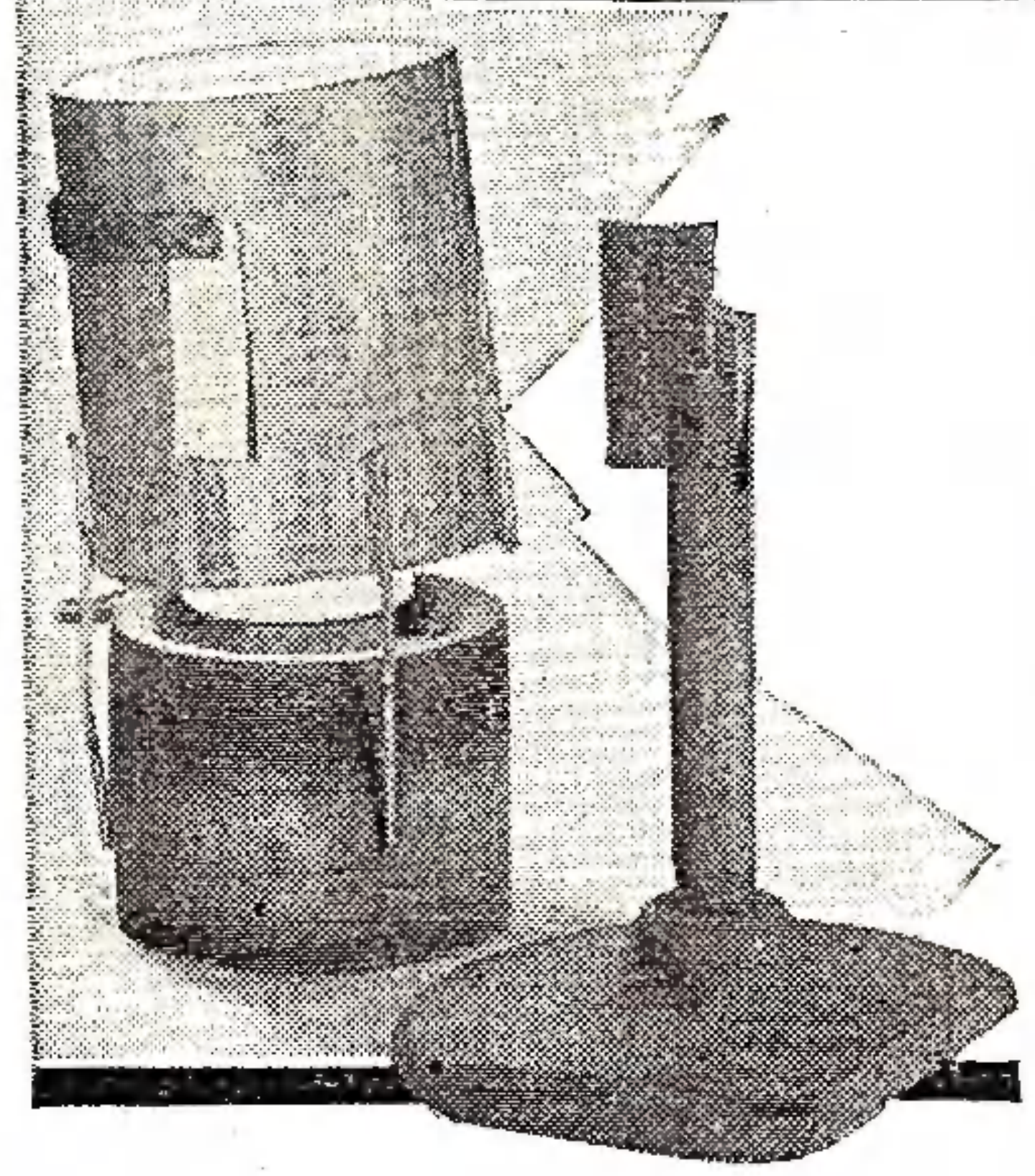
In preparation for this all traces of the previous coarser grade of abrasive must be removed from the working surfaces, *surroundings, clothes, hands and fingernails!* At this stage as well as throughout all operations of fashioning the mirror the utmost need for scrupulous cleanliness can *not* be overemphasized. The next grinding operation is performed with the next finest grade of carborundum, i.e., the No. 120. In mirror grinding, the grinding down to exhaustion of an application of carborundum and water is called a "wet." Proceed with as many "wets" of the No. 120 carborundum as are necessary to obliterate the marks of the coarser No. 80 grade and then test again with the template. Continue with the No. 120 until good coincidence with the template is attained, as the succeedingly finer grades will not appreciably change the curvature.

If your curved mirror surface is a bit too deep it can be made shallower by shortening the stroke; if it has not as great curvature as the template the center of curvature may be shortened by lengthening the stroke. When the proper curvature has been reached, "clean house" most thoroughly again and proceed with the successive stages of fine and finer grindings. Each successive stage of fine grinding should involve about a half-dozen "wets" of 5 or 6 minutes' duration each; until when the No. 6F Turkish emery stage has been passed it should be possible to read fairly fine type through the glass. During the fine grinding stages it is necessary to employ a more accurate means of testing for curvature than is afforded by the relatively rough template. Wash the mirror and the tool thoroughly and dry them.

Here is shown the method of using the simple Foucault apparatus for determining the spherical aberrations of the mirror. All that is needed in the way of materials are a light, a can, a piece of tinfoil and an old razor blade. This will give very accurate results.



Above is shown the diagram of the Foucault test. If the mirror is truly spherical the pin point of light emanating from the tinfoil will appear to the eye as a bright flat surface throughout the face of the mirror.



Testing for Accuracy

Across the concave surface of the mirror draw two or three pencil-line diameters. Lay the mirror back down on the tool and revolve it around its own axis. If the true spherical relationship has been maintained the pencil lines will rub out equally and simultaneously; if not, the higher or lower areas on the mirror's surface may be equalized by changing the stroke as previously outlined. Upon the successful completion of the grinding stages the mirror is now ready for polishing.

Polishing

"Clean house" thoroughly again as before—more thoroughly if possible. It is a good precautionary measure to remove all subsequent polishing operations to another part of the shop to avoid any possible con-

(Continued on page 24)

How to Build "Old Man River"—a Scow Houseboat

by **JARVIS L. STUMPF**

REMEMBER the time you were out in a boat in the moonlight, and the moon-path shone on the water, and peace and tranquillity were everywhere?

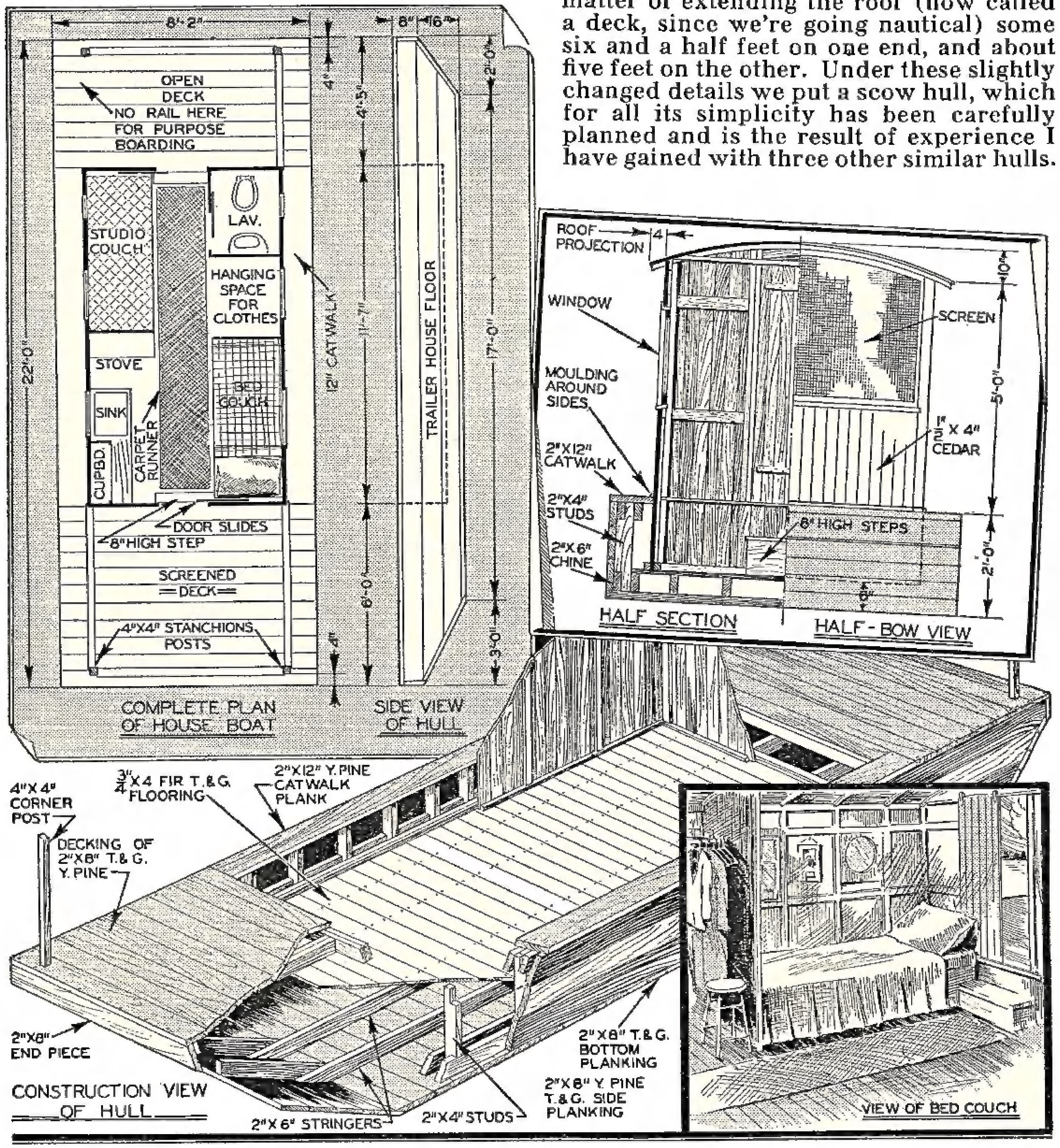
In times like these it is good to realize that the woes of the world are man made; there is nothing wrong with Mother Nature. She makes the bees to buzz, and the corn to grow, the water to surge and the rivers to flow; let's get away from it all and enjoy ourselves in spite of the Depression! Let's take that trailer house we built from plans in M-M a couple of months ago, and put a hull around her so she'll float and then we can while away our time on some southern bayou, or lazily float down the Mississippi or Ohio or Monongahela or Hudson or whatever stream happens to be nearest your home.

Let's go! Here's how:

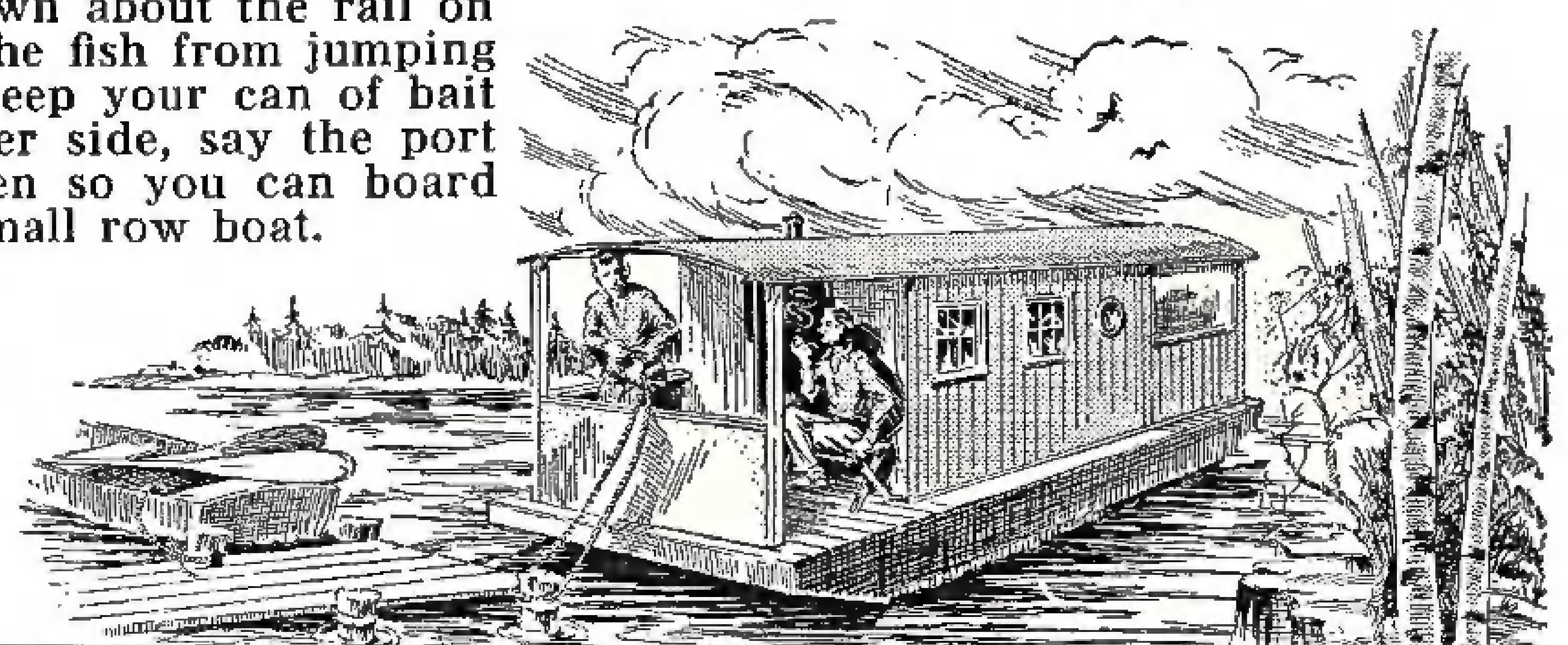
The house is the same house as was fully and completely dimensioned and detailed in M-M for May. I have not shown this in repetition, for the only changes are the matter of extending the roof (now called a deck, since we're going nautical) some six and a half feet on one end, and about five feet on the other. Under these slightly changed details we put a scow hull, which for all its simplicity has been carefully planned and is the result of experience I have gained with three other similar hulls. Under the ends of the roof—pardon me, I should say deck, we put good old 4"x4" fir pilaster (now called stanchions) and there is our houseboat! One end of the boat can be screened, and the other can have a canvas bulwark thrown about the rail on three sides to keep the fish from jumping on deck when you keep your can of bait outside, and the other side, say the port side, can be left open so you can board your yacht from a small row boat.

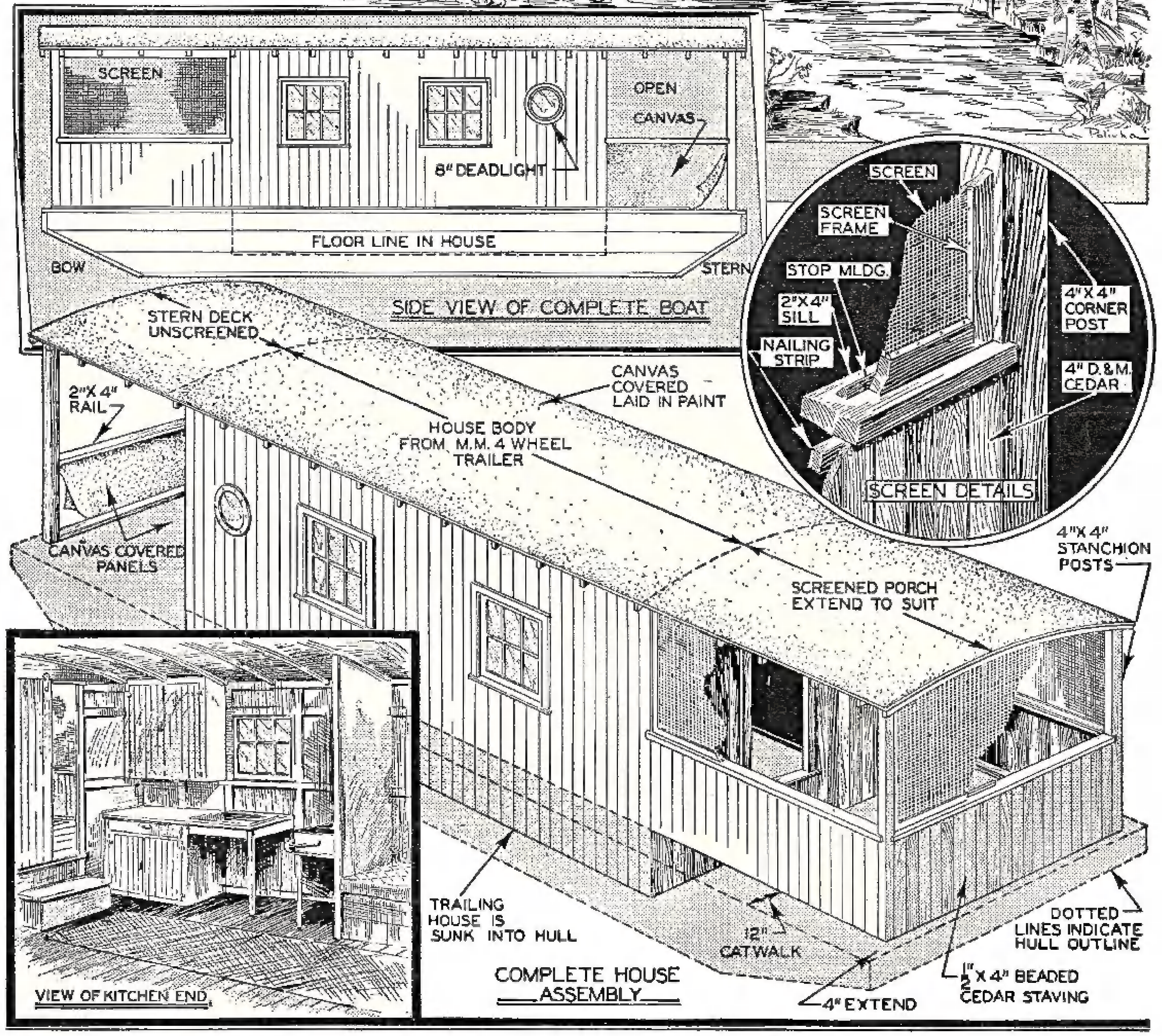
The arrangement plan is the same as that worked out for the trailer, and I wouldn't change it a hair. The doors slide to save space, and the kitchen sink, lavatory, stove and toilet have all been placed with an eye to trimming the ship properly. If you go shifting the weights around you will have a boat that will sit

(Continued on page 128)

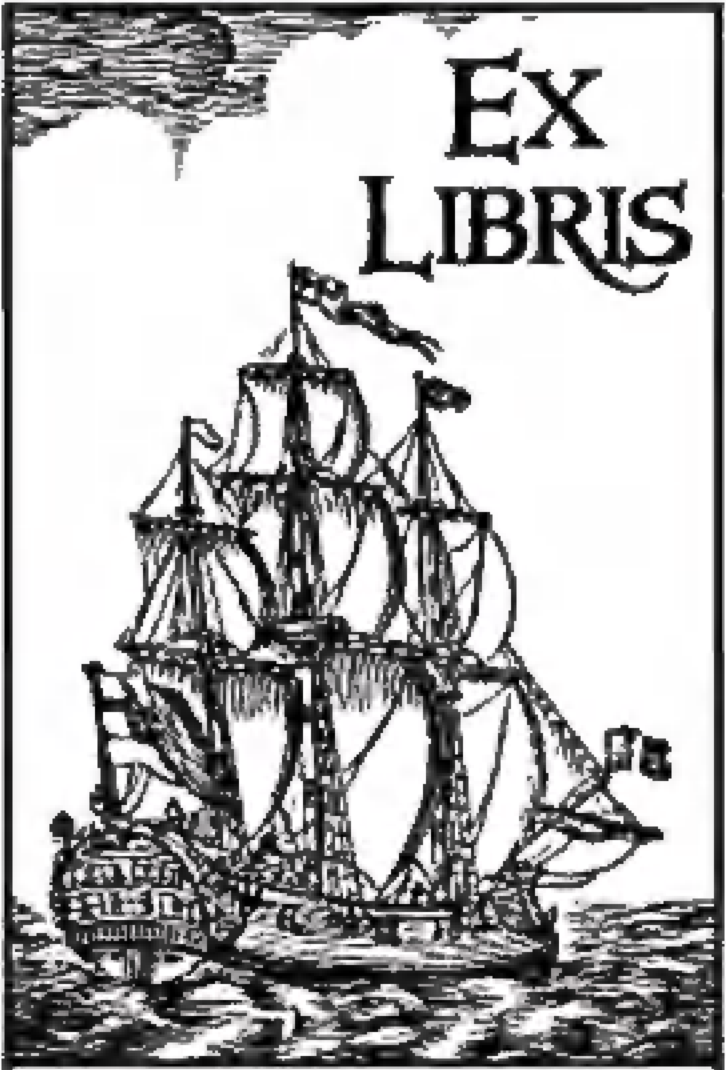

8'-2"
8"
16"
2'-0"
4'
4'-5"
11'-7"
17'-0"
22'-0"
6'-0"
3'-0"
4"
OPEN DECK
NO RAIL HERE FOR PURPOSE BOARDING
STUDIO COUCH
LAV.
HANGING SPACE FOR CLOTHES
STOVE
SINK
BED COUCH
CUPBD.
CARPET RUNNER
12" CATWALK
TRAILER HOUSE FLOOR
DOOR SLIDES
8" HIGH STEP
SCREENED DECK
4"X4" STANCHIONS POSTS
COMPLETE PLAN OF HOUSE BOAT
SIDE VIEW OF HULL
ROOF PROJECTION
4
10"
WINDOW
SCREEN
MOULDING AROUND SIDES
1/2"X 4" CEDAR
5'-0"
2"X12" CATWALK
2"X4" STUDS
2"X6" CHINE
8" HIGH STEPS
2'-0"
HALF SECTION
HALF-BOW VIEW
4"X4" CORNER POST
3/4"X4 FIR T.&G. FLOORING
2"X12" Y. PINE CATWALK PLANK
DECKING OF 2"X8" T.&G. Y. PINE
2"X8" END PIECE
2"X8" T.&G. BOTTOM PLANKING
2"X8" Y. PINE T.&G. SIDE PLANKING
2"X6" STRINGERS
2"X4" STUDS
CONSTRUCTION VIEW OF HULL
VIEW OF BED COUCH

The size of the hull is 22 ft. long by 8 ft. 2 ins. beam, by 24 ins. deep. It will draw about five inches of water. The details of hull construction as explained in the text apply to the middle and half section views. Note the layout is the same as the M-M Cabinette Trailer. The cabin is the same as the one described in the trailer plans which ran in May issue.




SCREEN
OPEN CANVAS
8" DEADLIGHT
FLOOR LINE IN HOUSE
BOW
STERN
SIDE VIEW OF COMPLETE BOAT
SCREEN
SCREEN FRAME
STOP MLDG.
2"X4" SILL
NAILING STRIP
4"X4" CORNER POST
4" D.&M. CEDAR
SCREEN DETAILS
STERN DECK UNSCREENED
2"X4" RAIL
CANVAS COVERED LAID IN PAINT
HOUSE BODY FROM M.M. 4 WHEEL TRAILER
CANVAS COVERED PANELS
4"X4" STANCHION POSTS
SCREENED PORCH EXTEND TO SUIT
TRAILING HOUSE IS SUNK INTO HULL
12" CATWALK
DOTTED LINES INDICATE HULL OUTLINE
1/2"X 4" BEADED CEDAR STAVING
4" EXTEND
COMPLETE HOUSE ASSEMBLY
VIEW OF KITCHEN END

The thumb nail sketches show how attractive the interior can be made. The catwalk space of 12 ins. around the cabin is necessary for handling the boat. Elevation and isometric details show the plan of the outboard profile and how the roof of the trailer cabin is extended in the ends to make service and screened porches.



Anon. Malefactor